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THE
Dental Summary

EDITED BY
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THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXVII JANUARY, 1917 No. 1

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REGULAR CONTRIBUTIONS

STONES VS. CHISELS

BY J. M. THOMPSON, D.D.S., DETROIT, MICH.

SO MUCH has been written upon cavity preparation in the past that it is not necessary to give a description of what is meant by extension for prevention.

Many good men have failed to follow the teachings of the late Dr. Black on account of what seemed to be a needless cutting of tooth substance, also because they have failed to realize how easily it may be accomplished by the use of thin carborundum disks.

Several years ago Dr. Taggart told the profession that stones inflicted less pain than burs and from long experience I know he was right.

Let us for example take a first molar, either upper or lower, with a large approximal cavity. An old and very good idea was to cut out the fissure with a cross-cut bur, carrying the cut through the enamel wall remaining above the cavity, and then to break the sides in with a chisel. This takes time and is not pleasant for the patient. If any one reading this thinks it is, let him have some one try it on one of his own teeth.

Margins to be ideal must be carried out far enough so that in the subsequent use of the brush they may be easily cleansed. Consequently, the use of the thin separating disk is indicated. By two simple cuts as indicated in Fig. 1, use of bur and chisel is at once eliminated.

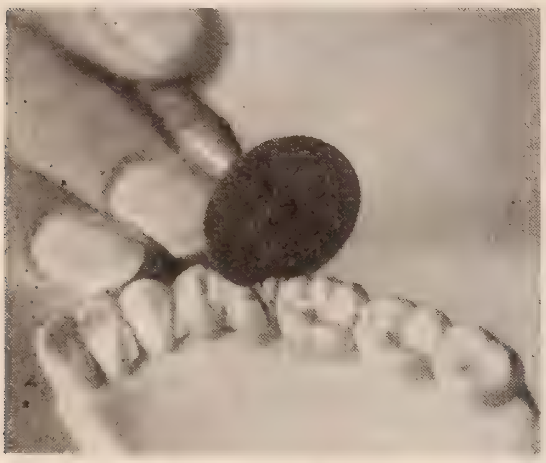

Fig. 1

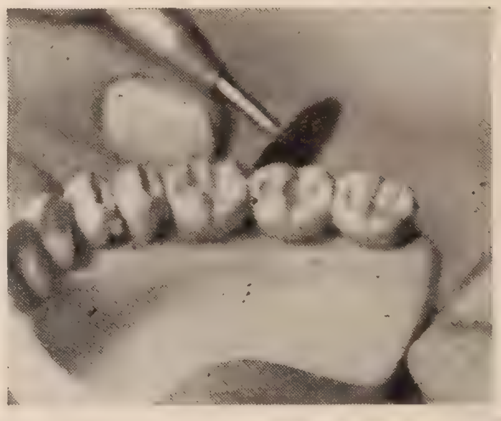

Fig. 2

With this operation the cervical margin is easily exposed and reached, and by the use of long safe-sided burs in the contra-angle hand-piece, finished to suit the needs of the case.

Let us take for another example a tooth in which the cavity at the cervical border extends bucco-lingually to such an extent that much cutting must be done to secure a straight line which obliterates all under-cuts caused by such decay. By following the line of direction as indicated in Fig. 2, the work is readily accomplished. Sometimes when cavities are not large and at one side, quite a portion of solid enamel and dentin must be removed to properly form the cervical border. If the first cut has been carried down to correspond with the depth of the cavity, this is easily removed by cutting from the cavity outward. In such cases the approximating tooth should be protected by a steel matrix, while tapered cross-cuts and stones are being used.

In the preparation of the step, the wall of enamel between the cavity and the deep fissure sometimes seems to contain all of the sensitiveness that any one tooth is entitled to. In bicuspids this wall in many cases can be cut through at the same time the outer walls are being cut down (see Fig. 1) and again the stone proves its superiority. Whenever a safe-sided stone is indicated, it should be used, although where there is plenty of room the ordinary stone will do as well.

In comparing the efficiency of the stone and the chisel, it may be possible for some to secure a perfectly straight wall from which an impression may be easily drawn; but many fail to realize why they have to try several times before accuracy is assured.

A glance at Fig. 1 will immediately show how easily the lateral margins may be prepared and the major part of the cutting done by two straight cuts.

Figs. 2 and 3 show correct position for the starting of the cutting, and Fig. 4 explains the use of safe-sided end-cutting burs and stones.

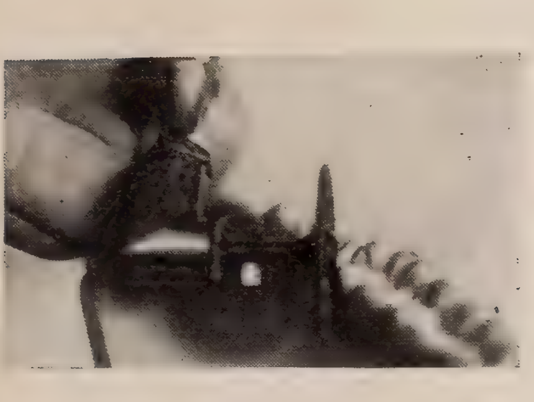

Fig 3

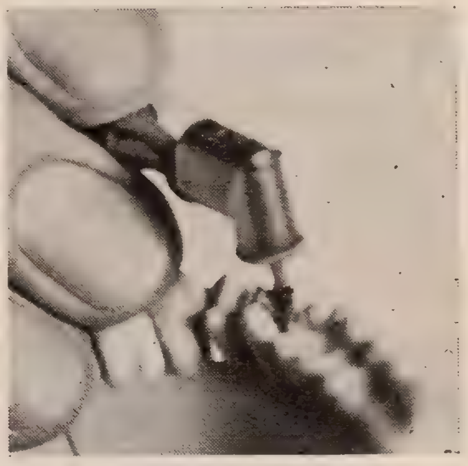

Fig. 4

About the only use for a chisel in this work is in beveling the margin of the cervical border, and for this Ivory's set of enamel finishers that cut on the three sides is indicated.

In MOD cavities, bevels and angles are more easily secured and the major part of the cutting done with disks. The fissures should be chased out with cross-cut burs with a moderate taper and finished with stones of the same size and shape. With all walls prepared in this way, the indirect method, with cast gold inlays, properly swedged into amalgam dies, gives us a result which never has been surpassed.

To Give a Facing a Light Gray or Blue Shade

To give a facing the light gray or blue shade at the tip when the body and the gingival should be of the yellow shade, can be very easily accomplished by laying a piece of 1–1000 platinum foil between the facing and the gold backing in the incisal third. Thus the reflection becomes a grayish color which would otherwise have been yellowish due to the presence of the gold back.

Sometimes for good and sufficient reasons it becomes necessary to seat an inlay that is good in every respect excepting a slight flaw or fault in one of the margins. This can very easily be fixed with a little gold foil. Have the surface of the inlay clean, grasp it firmly in a pair of tweezers, flux slightly and heat in a blue flame to a dull red. While at this heat a small pellet of uncondensed foil is stuck to the part of the margin that is shy. Then the inlay is placed in the cavity allowing the foil to condense against the cavity wall. When the inlay has been seated with cement the margins will be without the former flaw.—F. W. Brahm, *Pacific Dental Gazette*.

NEW CLEFT PALATE APPLIANCE AND TECHNIC OF MAKING*

BY W. H. O. MCGEHEE, D.D.S., M.D., CINCINNATI, OHIO.

ALL APPLIANCES for the correction of palatal defects heretofore presented to the profession and used by specialists in this field of work have been constructed on empirical lines and after immature and imperfect studies of the action of the muscles of the soft palate. It is surprising, after reading a description of these muscles in such standard works on anatomy as those of Gray, Piersol, Cunningham, Broomell, and others, and after hearing what remarkable claims have been made for the appliances advocated, how little has really been known of the true action of the muscles concerned, of the real needs of an effective appliance, and the shortcomings of the instruments devised for closing the cleft in these cases.

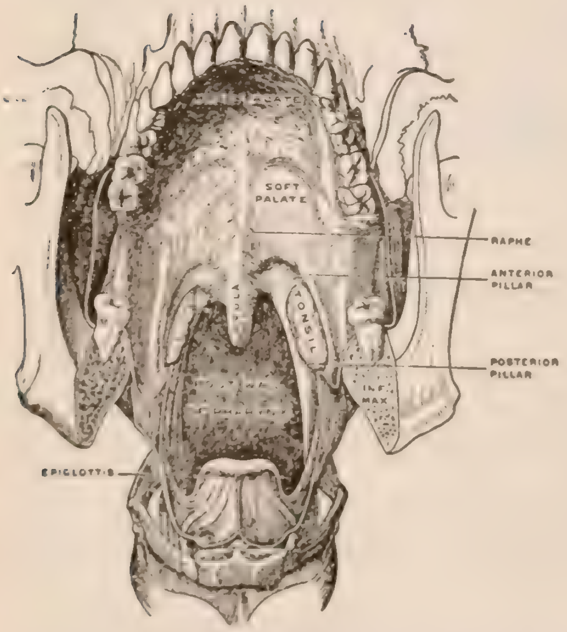

Fig. 1

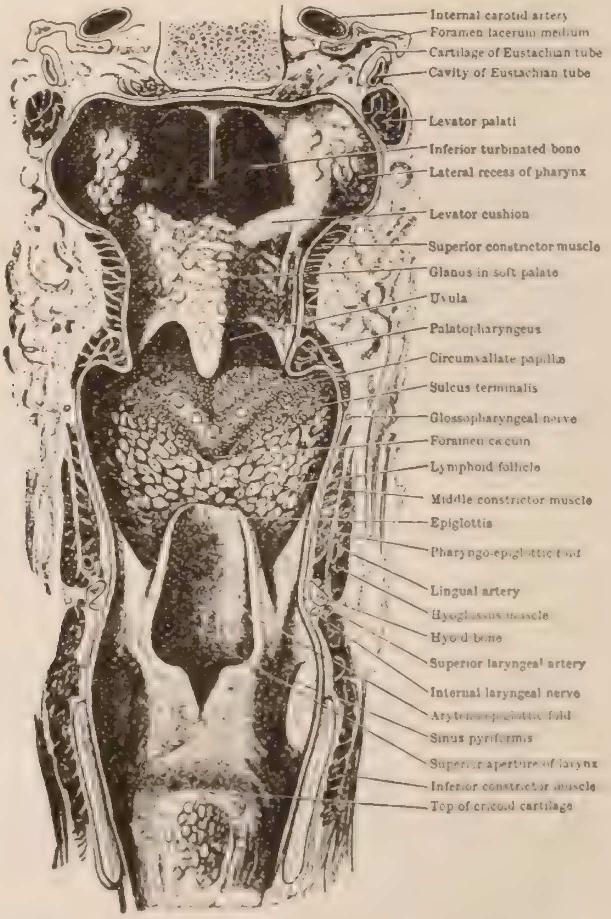

Fig. 2

Fig. 1. Antero-inferior surface of the soft palate. The tongue has been removed, so that the pharyngeal isthmus is distinctly seen. (Luschka.)

Fig. 2. Anterior wall of the pharynx with its orifices, seen from behind. (Cunningham.)

The misconceptions of the action of the muscles of the soft palate, or what remains of them when a cleft presents, and the defects of appliances used for closing the cleft, were first called to the attention of the writer five or six years ago by Dr. D. D. Cornell, who was then professor of prosthetic dentistry in the Ohio College of Dental Surgery. Dr. Cornell at that time constructed appliances for several cases in our clinics, which were made after a clinical study of the movements of the tissues bounding the cleft in these cases, with the result that marked improvement was made in the conditions obtained in correcting the defects. This was never reported to the profession. Since that time I have been engaged in a further study of the action of the palatal muscles, and in the perfecting of an appliance based on a rational conception of the needs of an instrument of this character, with the result that many improvements have been made on the instrument as first designed by Professor Cornell. In presenting this appliance to the profession I wish to extend my thanks to Dr. Cornell, to Dr. M. L. Bayliss, to whom I am indebted for the working out of numerous mechanical details incident to the construction and perfecting of the appliance, and to Dr. Hugh W. MacMillan and Dr. E. L. Everley for valuable assistance in the anatomical studies of the action of the muscles concerned.

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*Given as a Clinic, Tennessee State Dental Society, 1916.

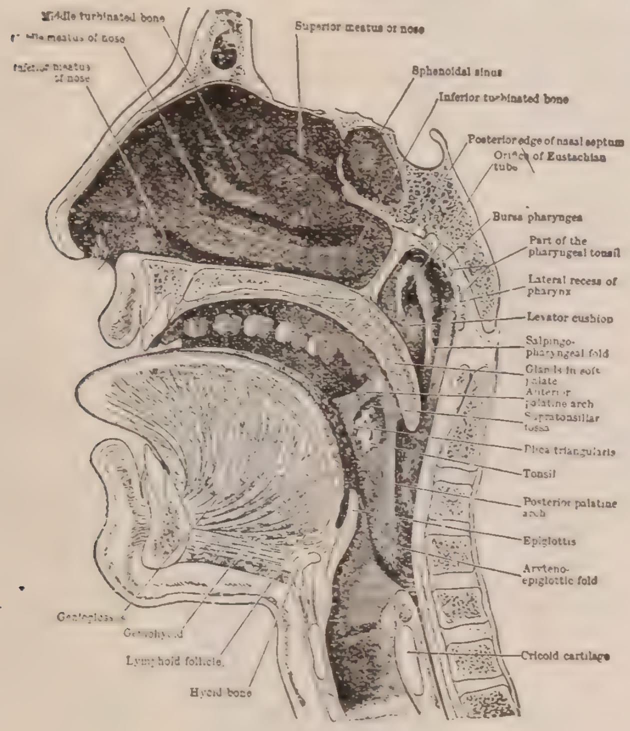

Fig. 3

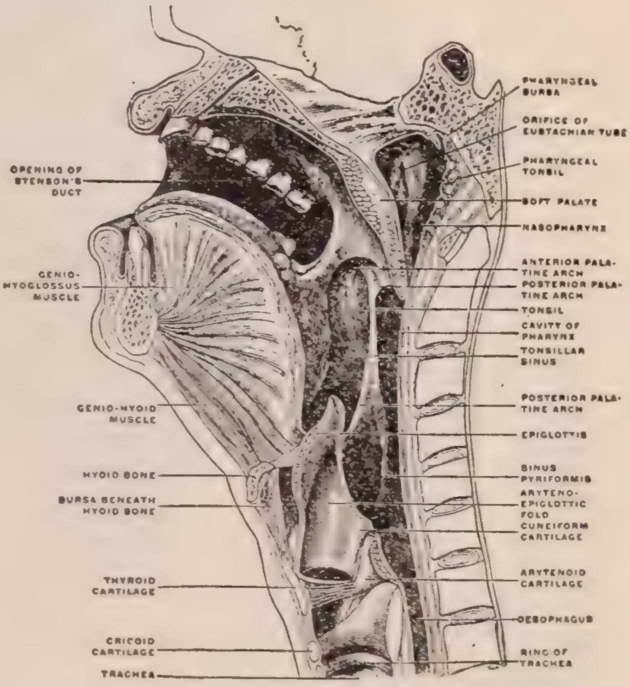

Fig. 4

Fig. 3. Sagittal section through mouth, tongue, larynx, pharynx, and nasal cavity. (Cunningham.)

Fig. 4. Sectional view of the mouth, pharynx, etc. (Gray.)

The soft palate and uvula constitute a muscular curtain or fold, covered on its upper and lower sides by mucous membrane, projecting backward and downward into the pharynx. They form the posterior portion of the floor of the nasal cavity and the roof of the mouth. *Figures* 1, 2, 3, and 4 afford excellent opportunities for studying their form, position, and relationships.

The muscles of the soft palate consist of five pairs, as follows, viz., the tensor palati (tensor veli palatini), levator palati (levator veli palatini), azygos uvulæ (M. uvulæ), palato-glossus (glosso-palatinus), and palato-pharyngeus (pharyngo-palatinus). A study of the origin, insertion, and action of these muscles, as described in all of the standard works on anatomy, fails to bring out some very important facts bearing directly on the subject in hand—facts which have not heretofore been brought to the attention of workers in this field, and which will presently be mentioned.

STUDY OF THE MUSCLES OF THE SOFT PALATE. (I) TENSOR PALATI

Origin: This muscle originates from the scaphoid fossa at the root of the pterygoid plate, the spinous process of the sphenoid bone, and the side of the Eustachian tube. (See *Figure* 5.) It passes downward and forward, and then in the form of a tendon, hooks around the hamular process of the sphenoid bone, where it spreads out like a fan to be inserted into the full length of the aponeurosis of the soft palate and into the transverse ridge on the lower surface of the palate bone. *Action:* It renders the palate tense, and owing to its fan-like insertion pulls the posterior part upward and forward. It also opens the Eustachian tube. In cases of cleft palate it would tend to pull the borders of the cleft upward, forward, and outward, thus further widening the cleft.

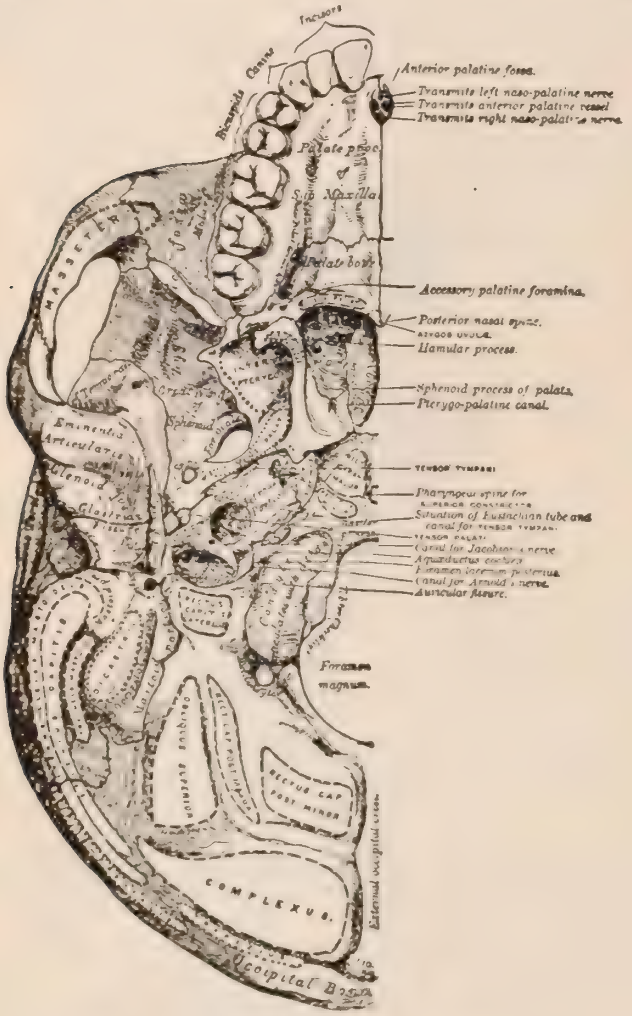

Fig. 5

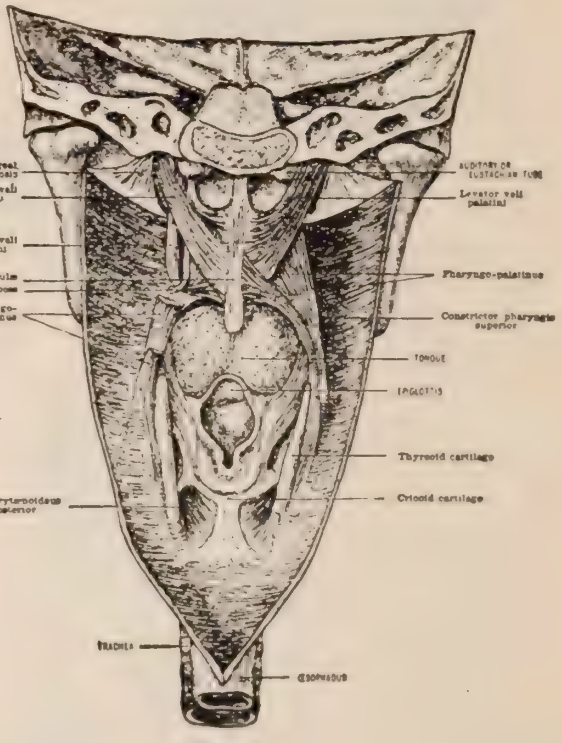

Fig. 6

Fig. 5. Base of the skull—external surface. (Gray.)

Fig. 6. View of muscles of soft palate, as seen from within the pharynx. (Morris, modified from Bourgery.)

(II) LEVATOR PALATI

Origin: It originates from the lower surface of the petrous portion of the temporal bone (see *Figures* 5, 6, and 7) and the cartilaginous Eustachian tube. *Insertion:* It passes downward, forward, and inward with the Eustachian tube, leaves it, and expands into a layer which spreads out into the soft palate. Some of the anterior fibers from the tube go to the back of the hard palate, forming the *salpingo-palatinus,* while others descend into the lateral wall of the pharynx, covered by mucous membrane, beneath the salpingo-pharyngeal fold. The great body of the fibers cross the middle line in the front part of the soft palate, most of them descending in the opposite side, and uniting with fibers from the fellow muscle. *Action:* It pulls the soft palate upward and backward, and also helps to render it tense. In cleft palate cases, it would also tend to widen the cleft.

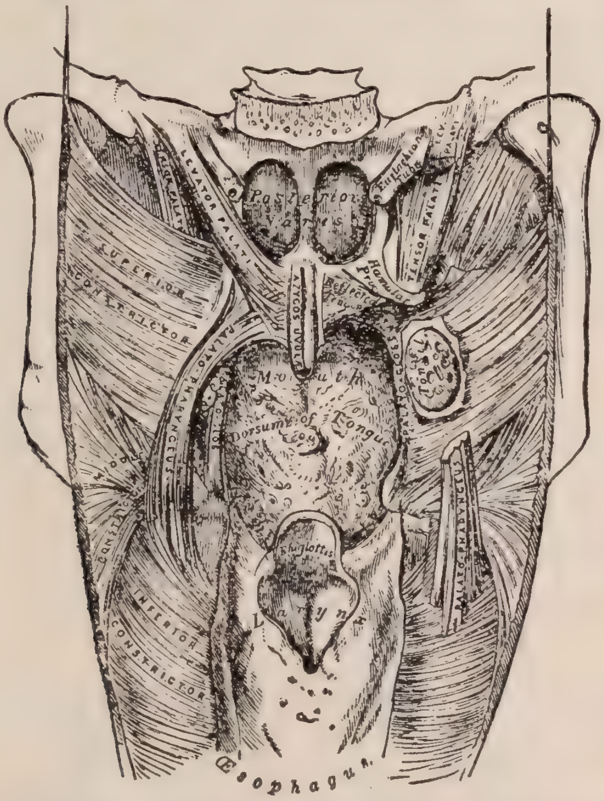

Fig. 7. Muscles of the soft palate, the pharynx being laid open from behind (Gray.)

(III) AZYGOS UVULÆ

Origin: This pair of muscles, lying in close apposition, originates from the tendinous fibers of the tensor palati and from the posterior nasal spine of the palate bone. (See *Figure* 5.) They pass backward and downward through the center of the soft palate (see *Figures* 6 and 7), to be inserted into the uvula. *Action:* They pull the uvula and soft palate upward and forward.

(IV) PALATO-GLOSSUS

Origin: This muscle, with its fellow of the opposite side, forms the anterior pillar of the fauces. (See *Figures* 1, 3, 4 and 7.) It originates from the inferior surface of the soft palate near the base of the uvula. It passes downward and forward, and is inserted into the base of the tongue. *Action:* It draws the soft palate downward and forward, and pulls the tongue upward and backward.

(V) PALATO-PHARYNGEUS

Origin: It originates in the substance of the soft palate in two distinct layers: (1) The thin posterior-superior layer continues across the median line and unites with its fellow of the opposite side, while (2) the antero-inferior layer, much thicker, is also attached to the posterior border of the hard palate. The levator palati and azygos uvulæ are inclosed between these two layers, which unite at the posterior edge of the palate and here receive additional fibers originating from the Eustachian tube and sometimes described as the *salpingo-pharyngeus.* The muscle passes downward and backward, forming the posterior pillar of the fauces (see *Figures* 1, 3, 4, 6 and 7), the fibers then spreading out into a thin sheet in the wall of the pharynx, being anteriorly in continuity with the stylo-pharyngeus, and are inserted into the posterior border of the thyroid cartilage and the aponeurosis of the pharynx as far down as the inferior border of the inferior constrictor muscle. *Action:* It pulls the soft palate downward and backward, elevates the pharynx during deglutition, and opens the Eustachian tube.

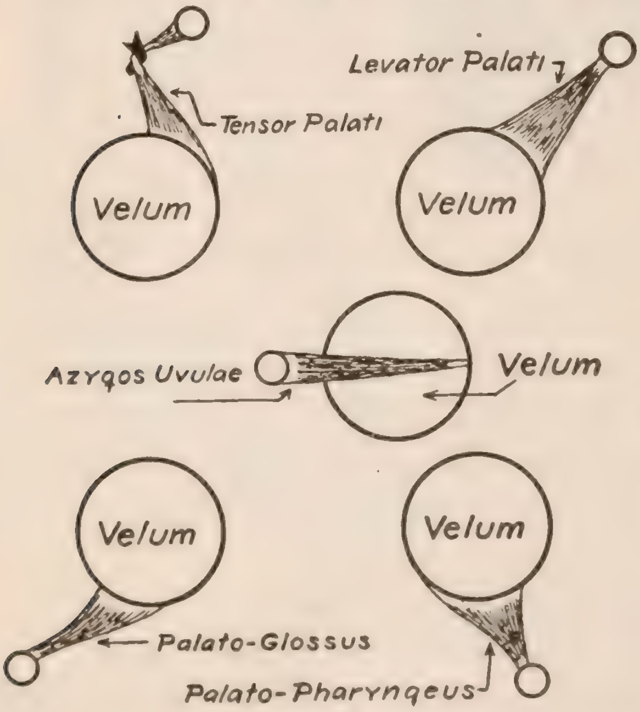

Fig. 8

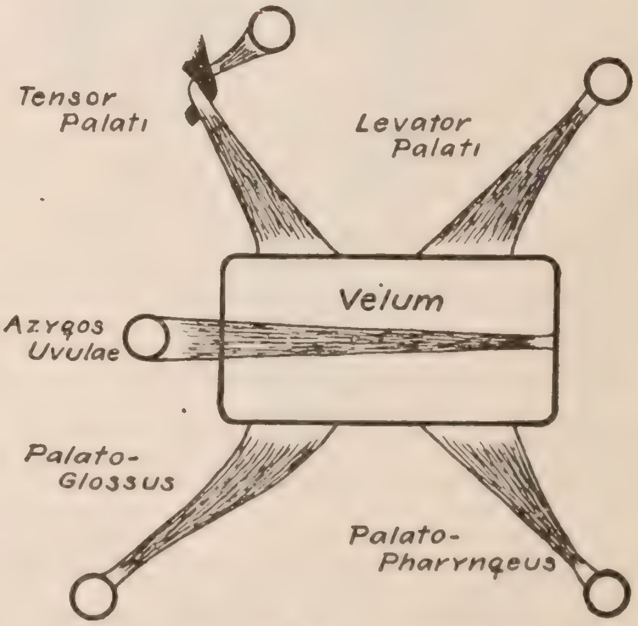

Fig. 9

Fig. 8. Diagrammatic drawing, showing action of the muscles of the soft palate.
Fig. 9. Diagrammatic drawing showing action of the muscles of the soft palate.

ACTION OF MUSCLES OF SOFT PALATE IN CLEFT PALATE

Summarizing the action of these five pairs of muscles with special reference to their bearing on the subject in hand, it will now readily be seen that—

(I) The *tensor palati* draws the natural velum upward and forward, renders it tense, and in cases of cleft palate further widens the cleft.

(II) The *levator palati* pulls the soft palate upward and backward, renders it tense, and still further widens the cleft if one be present.

(III) The *azygos uvulæ* pulls the organ upward and forward.

(IV) The *palato-glossus* draws the palate downward and forward.

(V) The *palato pharyngeus* pulls the palate downward and backward, renders the posterior portion tense, and in cases of cleft palate widens the posterior portion of the cleft. (See *Figures* 8 and 9). This being the case, it is now proved that the soft palate, instead of having only an upward and downward movement, as mentioned in text-books on anatomy, is really capable of four movements—that is to say, upward, downward, forward, and backward.

In cases of absence or loss of a portion of these tissues, the tensor action of the remains of the muscles mentioned and bounding the cleft would also still further widen the cleft. These facts have never been previously mentioned or understood by writers on this subject. Moreover, owing to the facts that the cleft is not always in the center and the remains of the tissues bounding the cleft are occasionally of unequal amount, there is frequently an uneven contraction or movement of these tissues during deglutition and speech, with the result that they will draw away, during the performance of these acts, from one or the other side of appliances as previously constructed, depending on which side of the cleft is capable of greater movement.

REQUIREMENTS OF A SUCCESSFUL OBTURATOR

It is now readily seen that a successful obturator should be capable, not only of upward and downward movements, but, in order that it may remain in perfect adaptation to the boundaries of the cleft under all circumstances, should really possess six distinct movements, that is to say, vertical (upward and downward), antero-posterior (forward and backward), and lateral (right and left). The appliance which I shall presently describe is designed with this idea in view, and is presented to the profession after adequate and successful trial in many clinical cases.

Action of the Constrictor Pharyngis Superior. Another muscle, which I have not mentioned, viz., the *constrictor pharyngis superior* (see *Figures* 2, 6, and 7), is also undoubtedly intimately concerned in the movements of a properly constructed artificial substitute. The expansion and contraction of this muscle has the function of enlarging or diminishing the diameter of the upper portion of the pharynx and of pulling its posterior wall forward in contact with the posterior extremity of the soft palate, or of a properly constructed obturator (see *Figures* 3 and 4), thus shutting off the nasal cavities during the formation of certain vowel and consonant sounds, and in the act of deglutition. An appliance which will admit of forward and backward movements will, undoubtedly, more perfectly adapt itself to the conditions created by the action of this muscle than one which is not capable of antero-posterior motion.

THE NEW CLEFT PALATE APPLIANCE, AND A TECHNIC FOR MAKING IT.

The appliance suggested consists of a metal or vulcanite plate with clasps, vulcanized or soldered into the heel of which is a clasp-metal extension, on which rests the hard-rubber obturator. From the center of the metal extension projects upward through the obturator a screw-cut gold post with a nut on its end. Vulcanized into the hollow portion of the obturator is a flexible clasp-metal tongue, through which the upright screw-post previously mentioned passes, and in contact with which it is held by means of the nut on its end. On the under surface of this metal tongue is a small gold hook, to which is attached one end of a spiral spring, the other end hooking around the upright screw-cut post. Another spiral spring extends from a similar hook, vulcanized into the posterior part of the upper hollow portion of the obturator, to the same upright post. The technic here described for obtaining the impressions and models, as well as for the construction of the appliance itself, differs essentially from the methods usually followed.

For purposes of description the procedures are arranged in four sections, as follows: (A) Making the plate. (B) Making the obturator. (C) Assembling. (D) Making the spiral spring attachments.

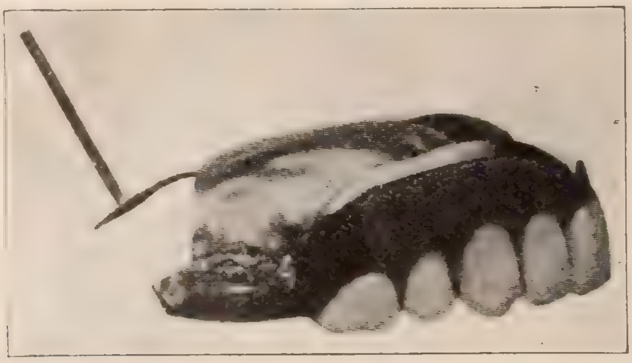

Fig. 10. Metal denture (vulcanite attachments) with backward clasp-metal extension and screw-post.

(A) *Making the Plate.*

A metal or vulcanite plate is constructed, with clasps, to cover the hard palate and any portion of the cleft in the hard palate. (See *Figure* 10.) To the heel of this plate is soldered or vulcanized a clasp-metal extension, one-half inch wide, 22 gage, following the direction of the cleft in the soft palate, on which the obturator is to rest. To the center of the upper surface of this metal tongue is soldered a perpendicular screw-cut gold post, 14 gage, with a nut on its free end.

(B) *Making the Obturator.*

1. An impression of the mouth is taken in modeling compound with a suitably shaped impression tray, making no special effort to force the impression material into the cleft. (See *Figure* 11.)
2. From this rough impression a cast is obtained. (See *Figure* 12.)

3. On this cast, an impression tray in modeling compound is shaped, embedding in the front of it a suitable handle of wood or metal, and in the heel, if found necessary, a wire loop, following the direction of the cleft in the soft palate, and lying immediately under it. (See *Figure* 13.)

4. On this impression tray modeling compound is adapted, extending it back and building it well up over the wire loop at the heel; this is inserted in the mouth and a second impression is secured, forcing the soft impression material into the orifice of the cleft. While the impression material is soft, the patient is instructed to "swallow" several times, in order to obtain a more perfect adaptation to the boundaries of the cleft.

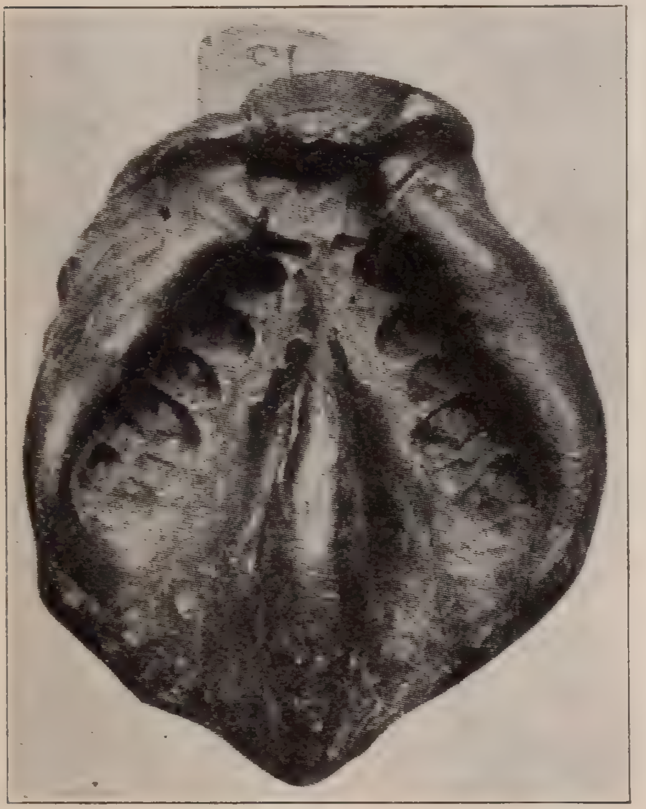

Fig. 11

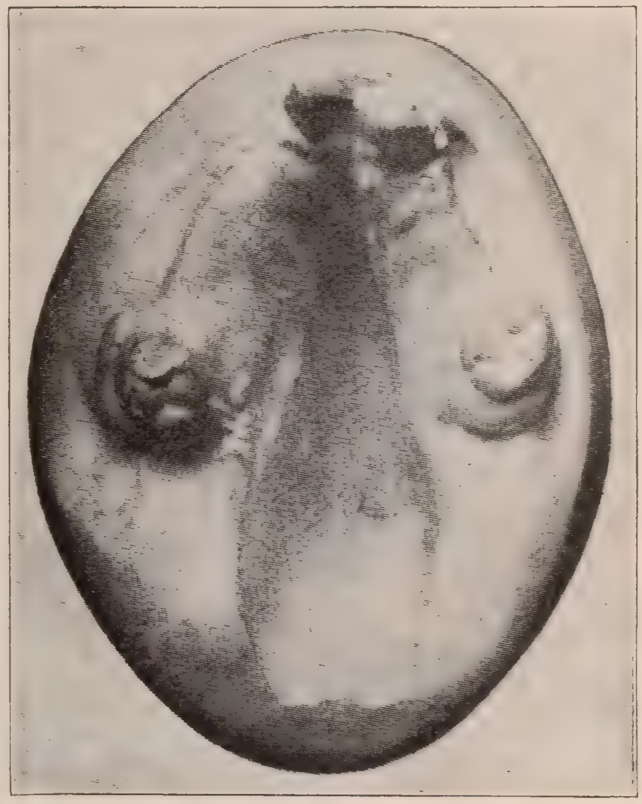

Fig. 12

Fig. 11. First impression in modeling compound.
Fig. 12. Rough model obtained from first impression.

5. After withdrawal, the surface of the impression is roughened, a thin layer of soft impression plaster is adapted and carried to position, the patient is instructed to swallow several times, and, after hardening, the impression is withdrawn.

6. After withdrawal, by the aid of wax matrices a sectional model is obtained in three parts, one part representing the anterior, the other two the posterior portion of the mouth. (See *Figures* 14 and 15.)

7. On this sectional model, which brings out the details of the cleft, a model of the proposed obturator is constructed in modeling compound, and to its inferior surface a wire handle about three inches in length is fixed, for convenience in handling. (See *Figure* 16.)

8. This model is tried repeatedly in the mouth, being held in position by means of the handle, until the muscles bounding the cleft are at rest, and then material is added, or any surplus thereof removed, until it fits the cleft in the mouth perfectly.

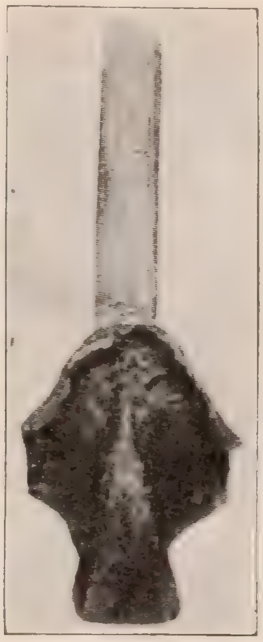

Fig. 13

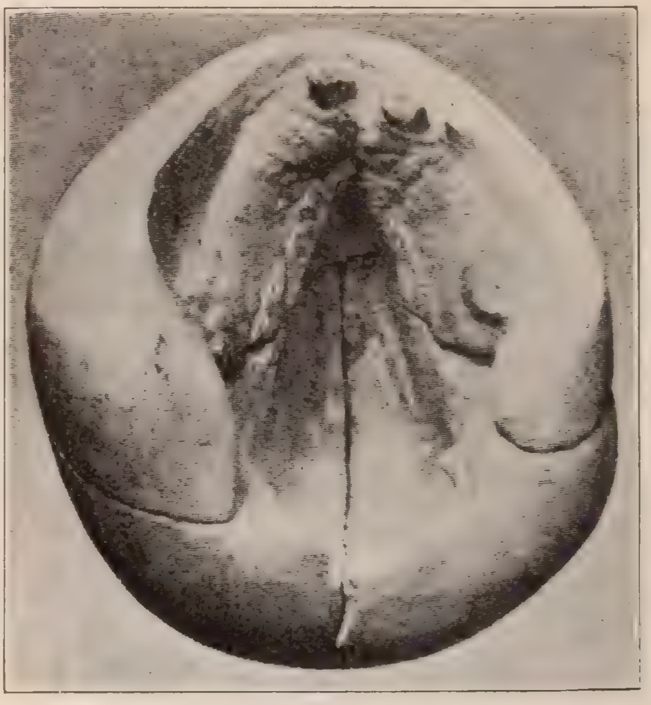

Fig 14

Fig. 13. Impression tray of modeling composition with wood handle, for obtaining perfected impression.

Fig. 14. Sectional model, obtained from last impression.

9. The model is removed from the cleft, the handle eliminated, and the model trimmed until it is smooth and ready for investing.

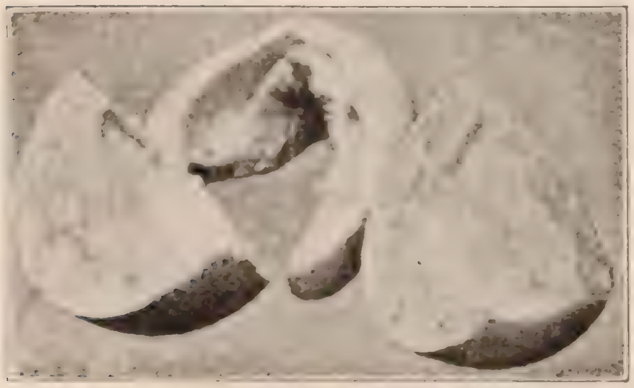

Fig. 15

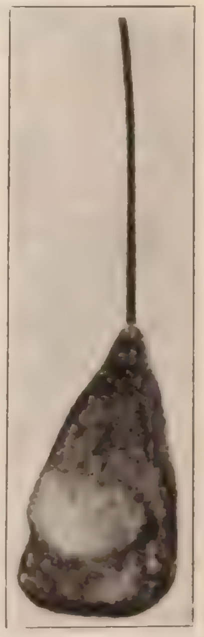

Fig. 16

Fig. 15. Another view of sectional model, parts separated.

Fig. 16. Model of proposed obturator in modeling compound with wire handle, for trial in mouth.

10. It is invested in plaster, obtaining a sectional investment in three parts, one being from the lingual surface of the obturator, the other two from its sides and upper surface; then the sections are separated and the model is removed from the investment.

11. An opening is cut through the top of this sectional investment, through which additional plaster may later be poured for the formation of a core. Before pouring the core, the inner walls of the investment are lined with sheet wax, leaving the center unfilled.

12. The extension of a small gold hook is embedded in the wax lining the posterior portion of the investment, and then soft plaster of Paris is poured through the opening previously cut, filling the central portion of the investment and bringing it out flush with the rest of the surface of the investment. *Figures* 17 and 18 show the sectional investments and core.

13. The investment is separated, the wax lining previously adapted is removed, and the central core and sides are covered with tin foil; then the bottom piece of the sectional investment is flasked in one half of an ordinary vulcanite flask, and the other pieces, with the core in position, in the other half; then the flask is closed.

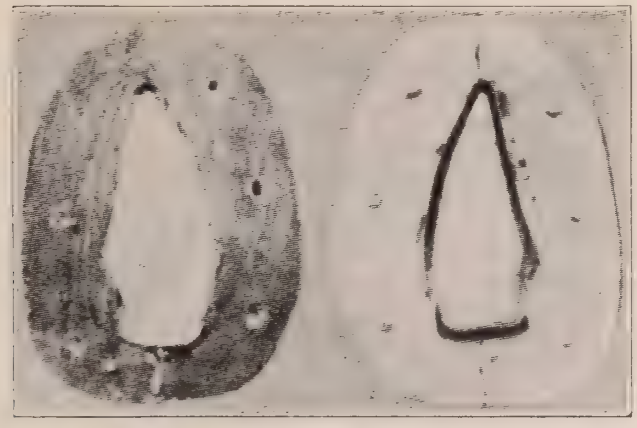

Fig. 17. Sectional investment with core in position, ready for flasking.

14. The flask is separated, packed with vulcanite, and vulcanized slightly short of complete vulcanization, when a hollow hard-rubber obturator, with a small gold hook in its upper posterior portion, will be the result.

15. Into the anterior part of the upper hollow portion of the obturator, at a level slightly higher than the gold hook, one end of a clasp-metal tongue, 25 gage, ⅜ of an inch wide, is fixed, its free end to extend back about three-fourths of the diameter of the obturator. On the under surface of this metal tongue is previously soldered a small gold hook, similar to the one previously vulcanized into the obturator. Now the obturator is vulcanized to complete vulcanization. (See *Figure* 19.) To avoid a second vulcanization this metal tongue may be fixed in position in the wax lining of the sectional investment, when, on pouring the core, its proper relations are maintained.

(c) *Assembling.*

1. The obturator is placed in position in the cleft in the mouth, holding it in place by means of a string attached to it, which is passed through the nares.

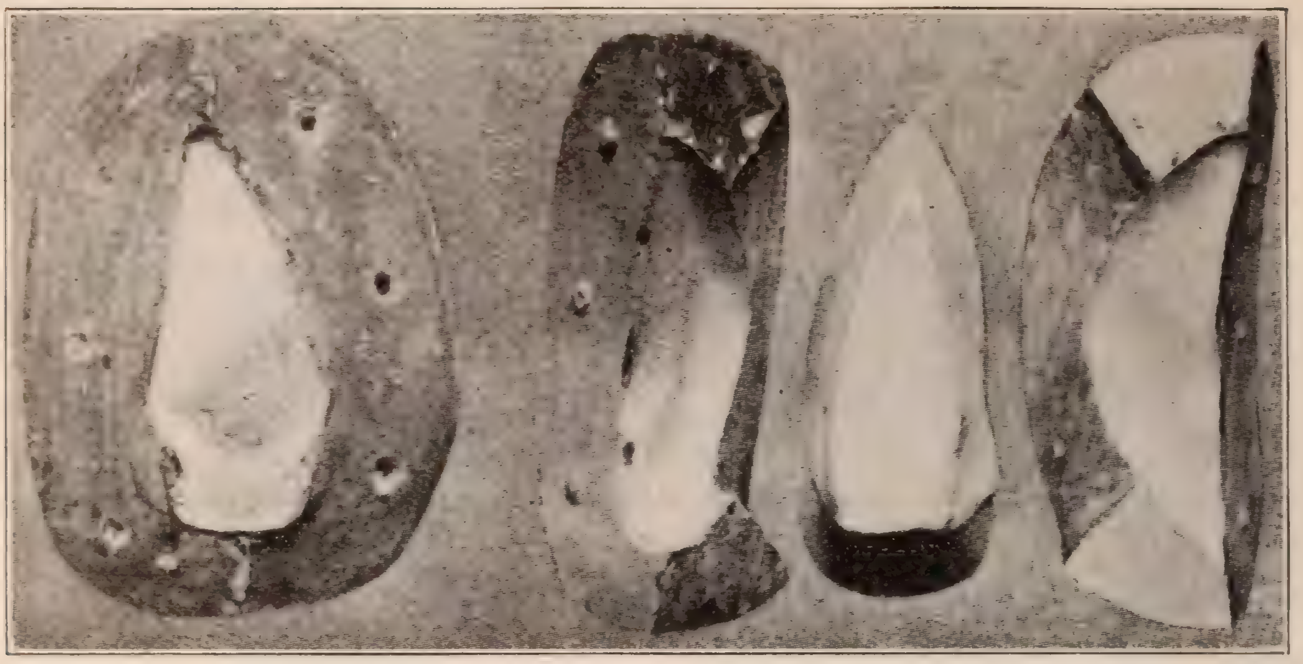

Fig. 18. Sectional investment and core separated to show individual parts.

2. The metal or vulcanite plate is placed in position, and on the under surface of the obturator, by means of the perpendicular screw-post on the metal backward extension of the plate, the location is marked of an opening to be cut, through which the screw-post is to pass.

3. The plate and obturator are removed, an antero-posterior oblong opening, about one-half inch long, is cut through the under surface of the obturator at the point marked, and a like opening immediately above it in the metal extension in the hollow part of the obturator, these openings to be slightly forward of its center to allow for backward play of the obturator. (See *Figure* 19.) The plate and obturator are assembled by passing the upright screw-cut post on the backward extension of the plate, through the oblong hole already cut in the obturator, and also through the oblong hole provided for it in the clasp-metal tongue in the upper hollow portion of the obturator. Now the nut previously provided for that purpose is

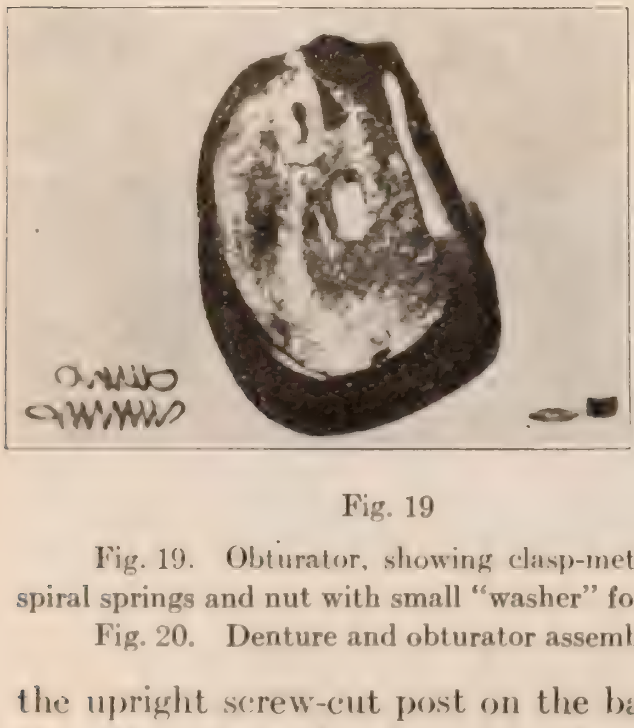

Fig. 19

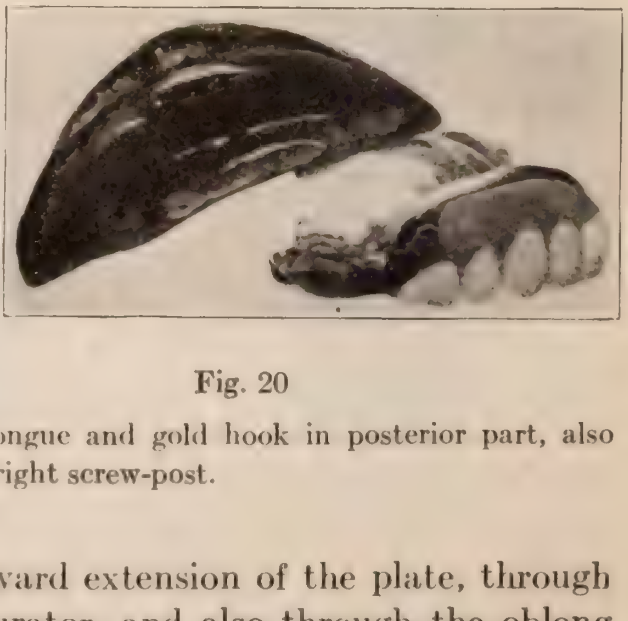

Fig. 20

Fig. 19. Obturator, showing clasp-metal tongue and gold hook in posterior part, also spiral springs and nut with small "washer" for upright screw-post.

Fig. 20. Denture and obturator assembled.

screwed into place on the end of the upright post, bringing it closely in contact with the metal tongue of the obturator. (See *Figure* 20.)

4. The assembled plate and obturator are tried in the mouth to test their proper relations.

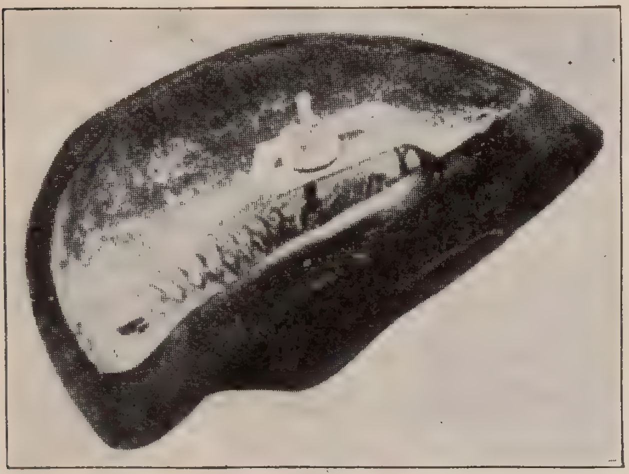

Fig. 21

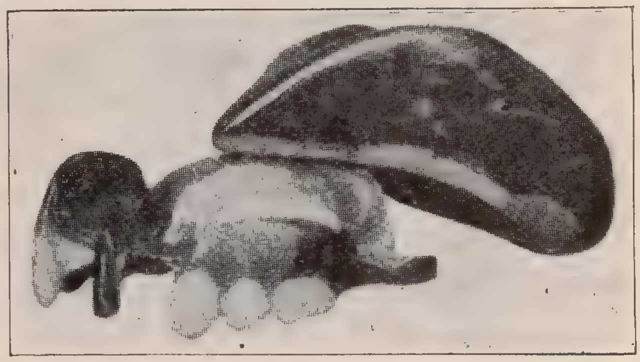

Fig. 22

Fig. 21. Obturator with spiral springs and other attachments in position.
Fig. 22. Side view of plate and obturator.

(D) *Making the Spiral Spring Attachments.*

Gold wire 20 gage is drawn down to 26 gage, to give it the necessary spring, and two spiral springs of the proper length are made to extend from the two small gold hooks previously mentioned in the hollow portion of the obturator, to the central perpendicular screw-post, one distally from the anterior and the other mesially from the posterior hook. (See *Figures* 19 and 21.)

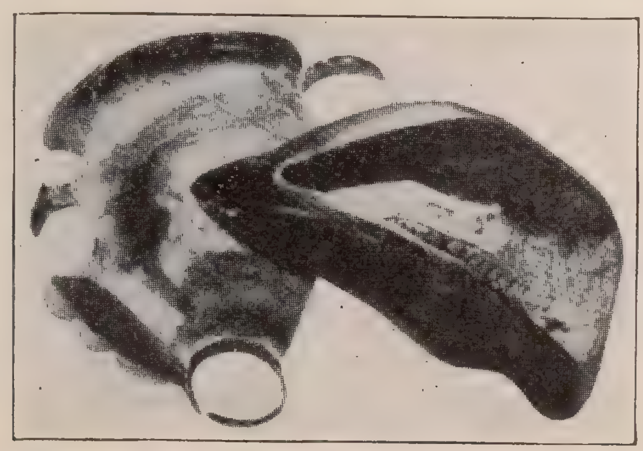

Fig. 23. Another view of the appliance.

2. The nut on the end of the upright post is loosened, the end of one spiral spring is attached to the anterior hook, the end of the other to the posterior hook, and the opposite ends of both to the upright post; then the nut is screwed to the position which will give the metal tongue the proper tension to allow for upward and downward movements of the obturator. The spiral springs extend along the under surface of the clasp-metal tongue of the obturator, and are given the proper tension to regulate the backward and forward movements of the obturator. *Figures* 22 and 23 afford additional views of the completed appliance, which is now ready for use.

MANIPULATION OF AMALGAM*

BY THOMAS P. HINMAN, D.D.S., ATLANTA, GA.

EX-PRESIDENT OF THE NATIONAL DENTAL ASSOCIATION

IN PRESENTING to you a subject with which you are all very familiar, the "Manipulation of Amalgam," I have endeavored in a way to standardize some of the features of the manipulation of this material. Practically none of the work that I am going to present today is original. I discovered many years ago that I never did anything original, and the reason for this was because once, in talking to a man on the subject of cohesive gold and its manipulation, and bringing out something that I thought was new and original, he said, "Oh, yes, Doctor, I did that twenty years ago." So I said, "Did you ever find that if you dipped your cohesive gold in pure apple vinegar it would make it very much more cohesive?" and he said, "Oh, yes, I did that twenty-five years ago."

The material about which I am to speak this morning is one that has, unquestionably, been very much abused. Very little had been done on the subject of amalgam until the classic researches by Dr. Black, in which he showed the necessity for balancing the alloys, and gave us such wonderful measurements as to its contraction, expansion and flow. I feel sure that many of us have forgotten the materials that are in amalgam, and know very little about them or their peculiarities, and thus we have failed somewhat in our technic.

The technic that I am going to present this morning is a rather radical departure from that usually used. There are two things in this manipulation to which I wish to call your particular attention—they are *Condensation and Adaptation.* Try and keep these two terms well fixed in your mind. They are entirely different.

Amalgam is composed, we know, of three metals—silver, tin and copper, and, in most instances, a small percentage of zinc. I will not go into the physical properties of these metals, because I am no metallurgist; but I will say this: that if we take the metals individually and find their affinity for mercury, we will see immediately that each one has a different affinity for this metal. For instance, I have in my hand a bar of pure tin, which can be bent readily, and this is the tin from which we make amalgam. It will not break at all. We can bend it, and bend it, and bend it. Let's see what will take place when we put a little mercury on it. Now we see that it breaks readily, just drops in half. We will take other materials, for instance, here is copper; and we will attempt the same experiment and see what takes place with copper. You see it does not amalgamate readily; we can hardly get it to amalgamate at all. We try to mix silver and mercury and see what takes place there. You see the bar bends. It does not break at all like the tin does. This teaches us from a practical standpoint—it teaches that we cannot expect to get a perfect amalgamation with the ordinary method of rubbing in the hand, because the mercury takes up the tin first, and I think silver comes next, and then copper; so if our technic does not include a perfect mixing of this material, we do not have a perfect combination.

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*Read before the Michigan State Dental Society, 1916.

In the classical work of McBain & Knight, a paper that they gave at the International Congress in London, published in the *Cosmos*, they very clearly bring out the particular feature of which I have just spoken; and they show very plainly the necessity for proper manipulation of the material, and the trituration before we begin packing.

Again, I have an illustration here that is somewhat interesting. Unfortunately I have not a slide of this. This little illustration I have is a series of bottles. It shows mercury in its crude state and its sublimated state. Fig. 1.

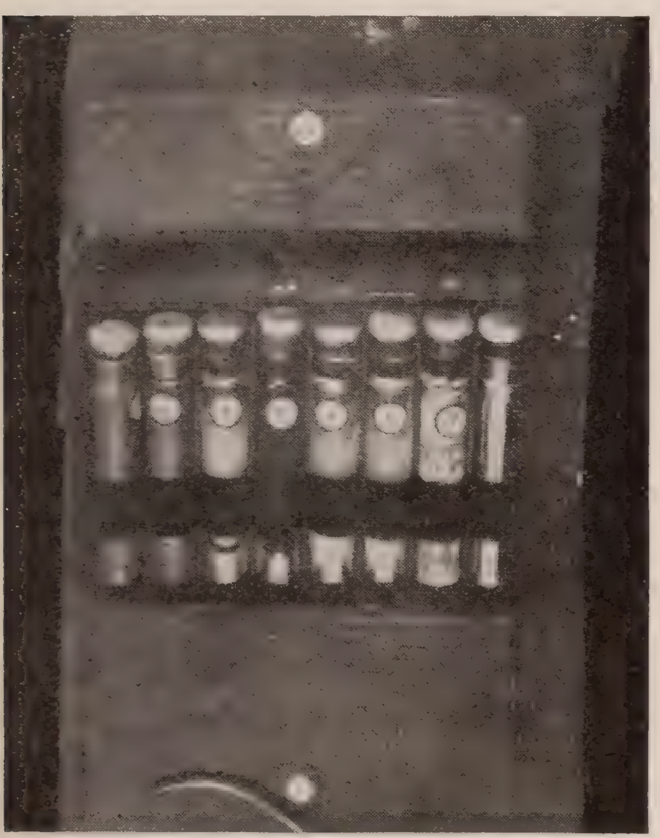


Fig. 1. Mercury from Crude to Refined.

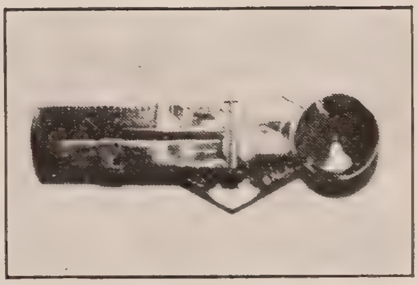


Fig. 2. Crandall's Alloy Balance.

Crude mercury, when found, is contaminated with a great many materials. Here we have crude mercury and next the sublimed. Now, by the use of an acid we take out the tin, then the copper, then the sulphur, then the arsenic and zinc, and here we have the pure mercury. These metals just mentioned are what you find in the ordinary drug store mercury, which is called the re-distilled mercury; therefore, if we are not careful to get pure mercury, we put into the combination something that was never intended. Just how much arsenic would be contained in ordinary crude mercury, the per cent., I can't say, but Dr. Prinz has shown very plainly that it only takes 1–40,000 of a grain of arsenic to cause pulp devitalization; therefore, we should be very careful in our manipulation to see that we have absolutely pure mercury and not contaminated with arsenic.

These are the general principles that should govern us in our work; that the material shall be of a known character, or reasonably well known; and when I speak of this, I speak of the high-grade alloys; but we should be just as particular about the use of mercury, to see that we get absolutely pure material.

I believe that in properly-selected cases, amalgam is one of the finest filling materials that we ever have had at our command. I know that a great many operators object to this, but I would like to ask you this one question: In the audience I meet this morning, you have some very famous gold inlay men—beautiful work, finished work, you are proud of their work, and so are they. How many men have you who are good amalgam workers, who have taken pride in their amalgam work? There are many conditions in the mouth where amalgam is indicated and gold is not, and the old fellows who did nothing but gold work, and were so wedded to gold that they took a solemn pledge that they would never use amalgam, did not, I believe, give their patients the very best service.

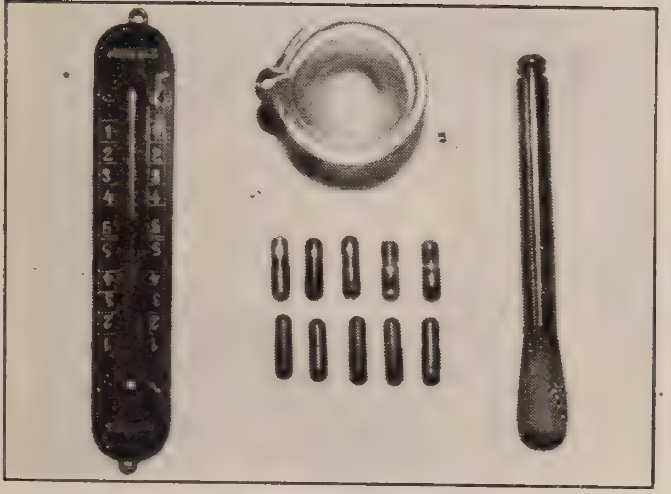
The radical departure in the manipulation of this material is: Instead of working a stiff mass in which there is crepitus, we work a plastic mass in which there is no crepitus. This is the radical departure from the former method of manipulating amalgam. After thorough trituration the material should always be packed before it shows any signs of crepitus, because after crepitus takes place we cannot adapt it; but we can condense it.

I believe in the air-test above that of the micrometer, and I have used the air-test in practically all of my work. The air-test was devised by Dr. Wedelstadt. I have found that it is practically impossible to adapt amalgam after crepitus has taken place. Therefore, I have to manipulate these materials in the plastic state; instead of squeezing out the excess mercury before attempting to pack, I squeeze and work it out during the process of packing.

If we take the mercury that is worked out during the manipulative process and weigh it, we find that it is practically the same in weight as the mercury that could be squeezed out previous to the manipulation. In other words, if I manipulate the plastic filling material and squeeze out the mercury during the process of manipulation and weigh it carefully, and take another batch and mix it with the same quantities and squeeze out the excess of mercury before manipulation, they both weigh the same; so we can, during the manipulation, take out the excess of mercury just as easily as we can before we attempt to pack. These are simple physical facts.

There is a peculiarity about amalgam that I have noticed when it is manipulated in the plastic state, that the non-plastic amalgam does not have; that is, adhesiveness. It actually has adhesiveness, and all of you have noticed, at times, in taking out amalgam fillings, how some of that amalgam sticks to the wall with great tenacity; and what is it? It is the adhesiveness of the material, and if it is manipulated in that plastic state we get this; if it is not so manipulated we do not.

We should standardize our work and, instead of guessing at things, we want to know definitely just what the proportions of mercury and alloy should be. This is governed by the manufacturer. He simply says, "use certain proportions." I do not always exactly follow the rule, because I have my own ideas about it; but approximately that is the rule to follow. In all high-grade alloys I have followed the rule of five to seven—five of alloy to seven of mercury, by weight. Some recommend seven to nine. Some recommend nine to eleven, in the proportion of nine to eleven. I have not gained the results that I have in proportions of five to seven. Therefore, if we will definitely weigh the materials and keep each in capsules, we are able to work amalgam definitely in a practical way, so that we know as soon as we begin just what results to expect. It is true that the batches coming from the manufacturers vary slightly, but we do know that if we work in definite quantities and in definite proportions, we are able to get results that we never have known before. There is one thing about the manipulation of amalgam that, to me, is extremely important; that is, carrying the amalgam into position, and as the amalgam goes into position in rather large quantities, it is tapped so as to make it begin to spread; then it is packed to place.



No. 3. Harper Pestle and Mortar, Sand Glass and Capsules of Mercury and Alloy.

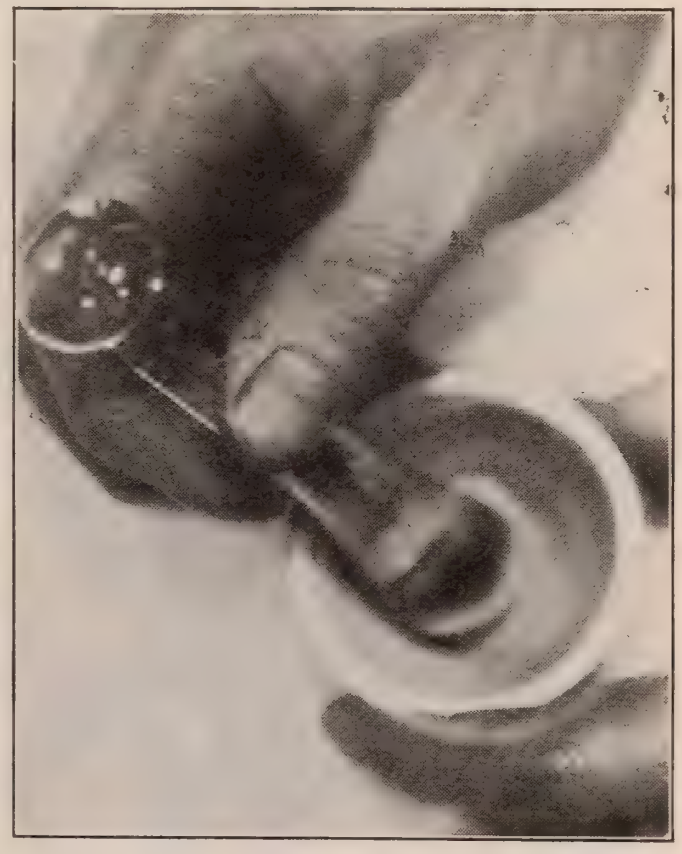


Fig. 4. The wrong way to hold the Pestle.

The most important factor in the entire manipulation of amalgam is the stepping of the margins. I never have been able to make a tight filling in a Harper pattern steel die unless I stepped the margins. You step half the diameter of the instrument all around every margin, and as you go along take the removed mercury. The instruments used in this process are —one 3-16, one 3-32, and another about 1-8 inch. I believe it is absolutely impossible to pack amalgam satisfactorily with round ball burnishers. If the instrument is too small you get bad results, the amalgam creeps out from under it. We should be able to use approximately fourteen or fifteen pounds pressure in condensing the material. I know the ability to create pressure with the fingers by the average dentist has become a little minimized since we ceased to manipulate soft foil, but in the condensation of this material you will find that it is very much better to use moderate-sized pluggers, and step half the diameter around the margin, in this way condensing the material thoroughly.

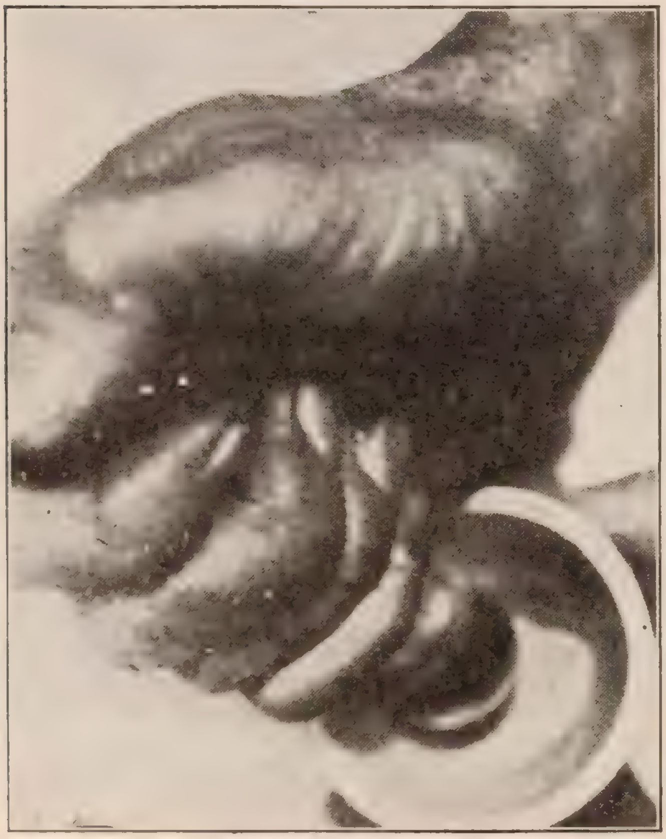


Fig. 5. The right way to hold the Pestle.

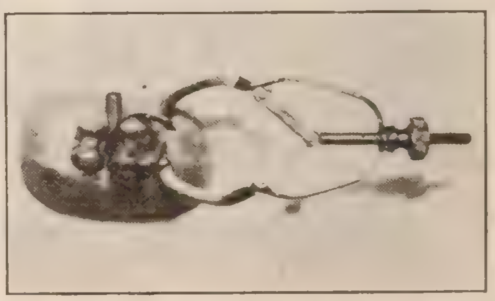


Fig. 6. Matrix in place, held by Wedge

I am now going to put the slides on and show you the methods that we use in the weighing of this material, and the method that is used in handling it. It also is known that it requires a definite amount of time to amalgamate amalgam to make a thorough mix. I have been much interested in doing some clinic work, and asking good amalgam operators to please make a filling for me, and please manipulate the amalgam in their usual way; and the best ones I ever have seen operate, usually took about half of the normal time that is required for the mixing of this material. It takes practically two minutes in the mortar in the hand to get the best results. Therefore, I am going to illustrate the handling of this material with a few slides. I believe we should come to a standardization of our methods, if possible. I am not attempting to say that I have standardized them, but I have done something toward bringing this work toward standardization.

This is the simple little scale (Fig. 2) we use in weighing our alloys. We weigh 15 grains alloy to 21 grains of mercury. That is the proportion I use in the manipulation of the usual standard amalgam.

Now, to be sure what we are doing, I think we must have a very deep mortar and a pestle that can be grasped in the hand. Fig. 3. You cannot take a small pestle that is held in the fingers and thoroughly grind and triturate amalgam.

This is a simple little sand glass (Fig. 3) that is used to show how much time we are consuming in the mixing of the material. This is all weighed by the assistant, and all you have to say is, 5 grains, 10 grains, 15 grains, 20 grains. Therefore, just as soon as we are ready to make our mix we turn the sand glass upside down, and the sand runs for two minutes. This (Fig. 4) illustrates the incorrect way to hold the pestle. See how it is grasped with the fingers. Here we have the correct method, grasped firmly in the hand so that you can thoroughly make the trituration. Fig. 5.

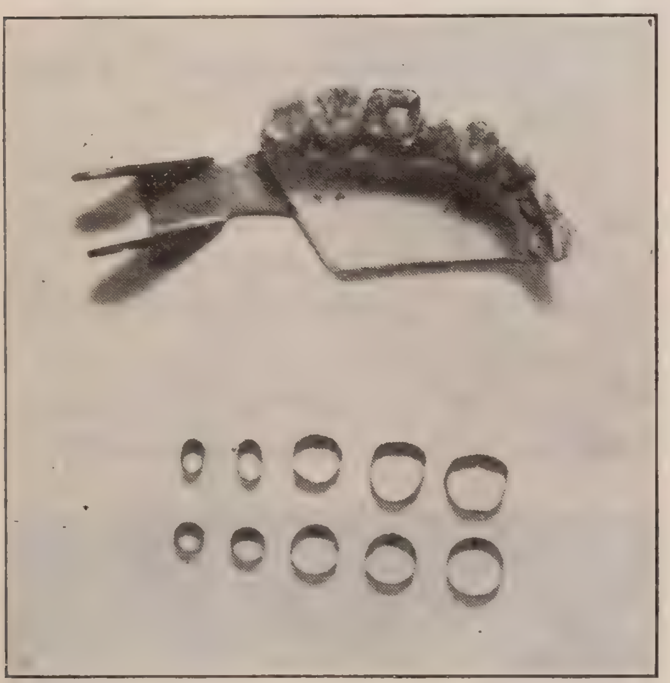


Fig. 7. Copper Matrix Bands.

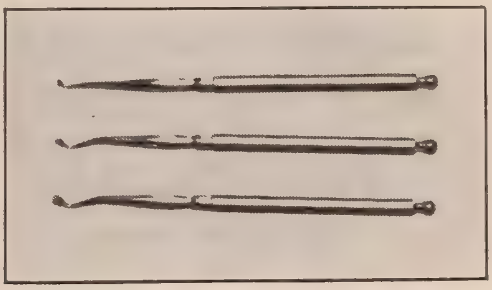


Fig. 8. Harper's Amalgam Pluggers.

No amalgam fillings can be properly condensed and adapted unless we have four walls, and those who are attempting to make fillings without four walls are surely producing failures. Fig. 6 shows the matrix in position, with the wood wedge put in from the lingual side; always from the lingual side because if we put it in from the buccal we produce a buccal embrasure instead of lingual inclosure. If we use the lingual embrasure we get proper lingual outlines. In cavities of the larger size we have a band that is shown here. Fig. 7. It is adaptable in a great many cases. In pressing the material down it does not flow too much over the margins. This shows the copper band in MOD fillings, in which the amalgam comes in contact with the approximating teeth. We do the manipulating of amalgam so many times carelessly, without getting sufficient separation. It is just as essential to get a correct separation and have the gums forced well back from the gingiva-cervical margin, as it is for any other filling material. When we put on these copper bands, we should always see that there is enough separation that when we finish the approximal contact, no space is left. The contact point should be overdone enough so that in finishing we will have enough material left to keep the contact points secure.

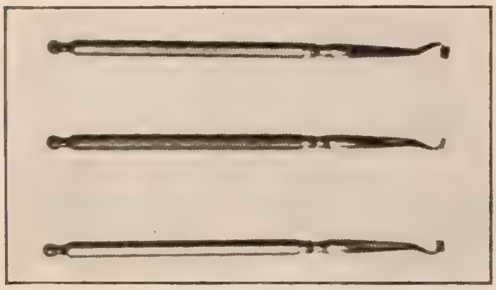


Fig. 9. Frane's Amalgam Carvers.

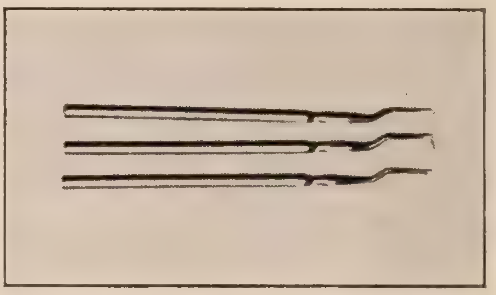


Fig. 10. Wedelstadt Knives for Truing Overhanging Margins.

These are the three instruments I use in the manipulation of this material. These three instruments (Fig. 8) I find sufficient for all my work. The middle and small sizes are used much more than the large one. I find if I attempt to condense with these very large instruments, the condensation is incomplete.

These are the carving instruments (Fig. 9) because I verily believe that the filling should be as religiously carved and closely reproduced in all the natural anatomical form of the teeth as in gold, or any other filling material. If we do amalgam work in a sloppy way we get sloppy results, but we can carve this work and finish and make a reproduction of the lost tooth

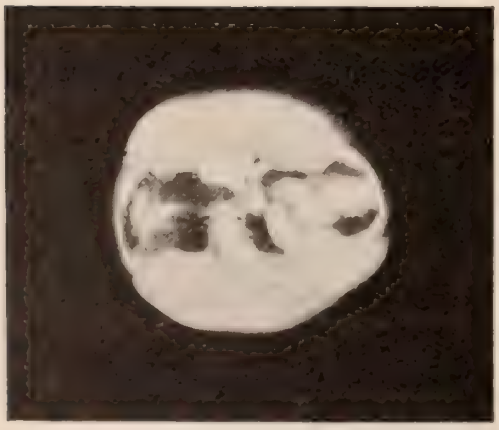


Fig. 11. Finished Filling.

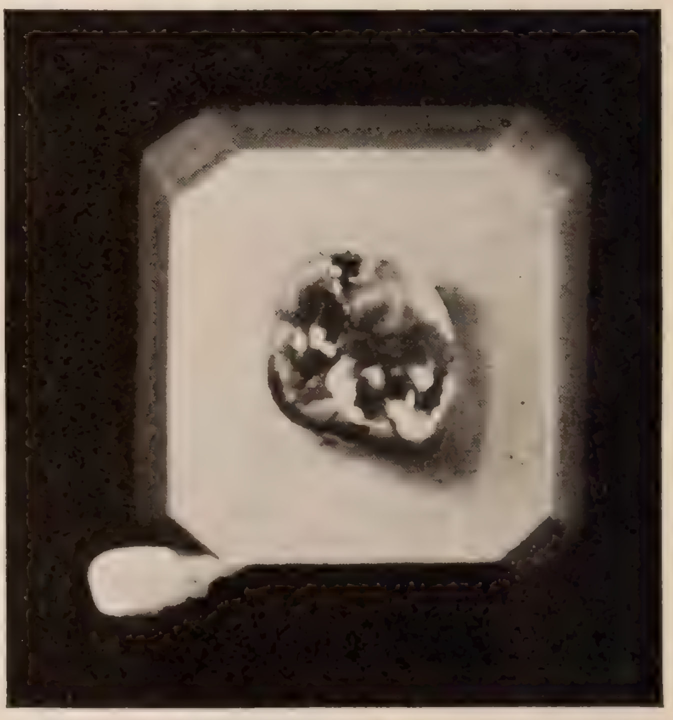
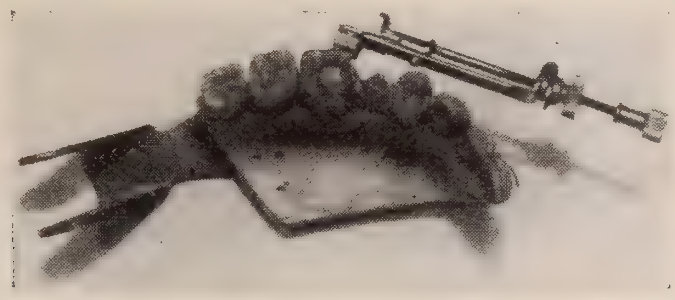


Fig. 12. Final Filling.

substance as well as we can any other filling material. Those are the models I use in carving. Very frequently in the manipulation of amalgam, no matter how tight you put on your matrix, a small amount will lap over the margin at the gingiva.

These are the knives I always have used for trimming the margins, (Fig. 10) the excess of amalgam that is left by overfilling. Both these knives are excellent for this particular feature of the work. This shows the finished filling, (Fig. 11). Unfortunately it does not show up very well, but you see that correct cavity extension has been made, and you will find that the outlines of the occlusal surface are finished carefully.

Here is a large restoration showing a disto-lingual cusp on an upper molar. Fig. 12.



Ivory Band Matrix.

Now, we are going to show you a moving picture in which I am going to attempt to show manipulation of amalgam as I do it. It is practically impossible for a moving picture to show you the defects in the fillings in steel matrices, and it is impossible to show you the finished work. In illustrating this we used the Wedelstadt air-pressure test, with which the most of you are familiar; and you are going to see me fill one of these steel matrices, and then you will see it placed on the testing machine, and you will find it only stands about 1½ or 2 pounds pressure. You will also find in there a number of fillings on the testing machine that have been in a die—six weeks to two months—standing pressure tests perfectly. The Wedelstadt form is simply a steel matrix having a set-screw on the under side. We make filling in the steel, take off the matrix, put on the testing machine and drop it into the water. I believe that is the most practical test for amalgam, and, so far as that is concerned, for any filling material. I would like you to note a few of the features and that is, as the hand goes around the instrument, you will see that it steps all the margin. You will also note that we never let the amalgam stay still. One of the worst features of the amalgam is to drop on your operating stand and cut it into squares. Never allow the amalgam to be still. If you do it begins to chill and harden, and crepitus takes place. It hardens very rapidly. Those who are only fairly skillful had better use the medium setting amalgam. My assistant stands by the chair and keeps this amalgam moving between her fingers all the time. It never stops.

INFECTIONS OF THE MOUTH*

BY ALBERT F. LINSCOTT, D.D.S., MARION, OHIO

"INFLAMMATION is a condition into which the tissues enter as a reaction from irritation."

"Infection is the implantation in the tissues of the body of living pathogenic organisms, in such a way as to favor their growth and permit their toxins to injure the tissues."

If every surface of every tooth could be kept perfectly clean, there would be neither diseased gums nor decayed teeth. By the proper care and the careful use of the instruments within our reach, this condition can be reached by many, and closely approached by all.

It is an accepted fact that the mouth is constantly inhabited by multitudes of germs besides those that produce decay of the teeth. Many of these are pathogenic. We are told that within the small space of an hour the particles of food remaining in the mouth may become filled with microbes, causing bad breath, and subjecting the body to disease.

Cavities in the teeth, diseased gums, and a "coated" tongue, serve as hotbeds for germs and freight the saliva with bacteria. These being constantly swallowed, produce fermentation, sour stomachs, eructations, headaches, and other diseases of a septic nature.

In perfect health normal human saliva is alkaline, and in a healthy mouth you will seldom find acid except after eating acid foods, fruits, etc. We find the alkalinity of human saliva so weak that it is hard to recover from an acid condition before more food is taken. Thus the condition of the teeth is jeopardized, and decay is constantly encouraged. The cause of fermentation is claimed to be lactic acid, which is formed by the action of the bacteria upon all cooked starches. Raw starches do not ferment, consequently do not promote decay.

It is interesting to know that the saliva of cattle, sheep, rabbits, dogs, etc., possesses a strong alkalinity, while we find an exception to the rule in animals kept as pets, and fed prepared foods.

Dentists being called upon to treat pus conditions in the mouths of patients should fit themselves to better understand the true relations existing between the pus in the mouth and the rest of the human organs.

Investigations show that fully 90% of the population of the country have infections in the mouth, in one form or another. The dentist should study each case as presented, and ascertain the causes of the infection.

Without doubt the most undesirable condition in the mouth is pyorrhea. This is only a chronic inflammation plus infection of the gum and peridental membrane, that destroys the tissue and finally involves the osseous tissues around the teeth. The disease progresses until the teeth are exfoliated. A clean tooth will not decay, and a clean gum tissue will not become infected.

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*Read before the Hocking Valley, (O.) Dental Society, 1916.

Local causes which produce inflammation are malocclusions, faulty operative procedure, deposits, etc.

For many years malocclusions were thought to be for the orthodontist, but today we are realizing that this branch of dentistry should interest all dentists. If the mechanics exhibited in the relation of one tooth to another immediately adjoining, is worthy of admiration, the relation between teeth opposed to each other are still more to be admired. Each tooth sits in a bony socket having frail walls. It extends a considerable distance out of the socket, and at the point of its furthest extension sustains heavy and complicated stress. When the tooth is in proper occlusion with the opposing teeth, this stress is so distributed by the occlusal planes or incisal edges, that no disturbance of the supporting tissues follow. But when the tooth enters a position of malocclusion, these forces which before supported it in health, injure it.

The tooth in malocclusion is generally the victim of undue lateral stress• great in amount and frequently repeated. The effect on the lateral walls of the alveolus is felt first by the peridental membrane, and then by the osseous tissue. The result is, the stretching of the peridental membrane, straining attachments, disturbing blood vessels, cramping nerve lines, and finally the partial or complete absorption of the lateral walls of the alveolus. A very common illustration of malocclusion, with resulting absorption of lateral wall of the alveolus, may be found in the lower second molar when the first molar has been lost. A tooth in normal occlusion may be placed in malocclusion by improperly articulated fillings or crowns. The effects on the tooth are identical with those in the malocclusions previously referred to.

The effects of malocclusions are not confined solely to lateral stress, or the lack of occlusion which the tooth receives. There is a form of malocclusion known as "excessive occlusion," in which a tooth receives more than the normal amount of opposing stress. This subjects the peridental membrane to undue pressure, or stretching in the opposite direction, pinching and retarding circulation. This pressure results in inflammation of the peridental membrane.

Under the head of faulty operative procedure, will be classed crowns and bridges which have been constructed to cover up, and the anatomical relation of the teeth have been overlooked, or fillings in which the point of contact has not been taken into consideration in their construction, leaving spaces for the food to deposit and ferment, starting irritations which choke the membranes in the inter-approximal spaces. These irritations are aided materially by the patient using picks and penknives in their effort to remove the offending substances.

In the perfect tooth, nature makes that contact point prominent and relatively sharp, with wide-open spaces of the approximal surfaces to the buccal and lingual. The approximal surfaces, apically to the contact point, separate rapidly, leaving considerable space. This space is the home of the inter-dental papilla. In perfect cases, the papilla fill the spaces between the approximal surfaces of the teeth up to the contact point, and from that point slope away palatally and buccally in such a way that food is diverted from between the teeth and thrown into the cavity of the mouth. It is the purpose of the contact point to so divide food which passes it, that it shall be capable of easy diversion by the inter-dental papilla. When these conditions have been reached the tissues and the teeth remain in health with very little care from the dentist.

When the dentist is called upon to restore the approximal surface of a tooth, he should have a clear conception of the functions of the contact point, and be able to carry out his knowledge in order to perserve the tooth, and keep the surrounding tissues in a state of health. He will find in his reach the opportunity to display all the skill he may possess.

Among the first of the deposits to be mentioned is salivary calculus, which is one of the principal irritants to be found in the mouth, deposited about the necks of the teeth, causing irritation and inflammation of the gum tissue and peridental membrane, also recession of gum tissue and the absorption of osseous tissue. This with other accumulations, as food deposits, induce disease of the gums and adjacent tissues, and although local in disposition is usually the cause of infections in the mouth.

We know that salivary calculus is a deposit from the saliva. In newly elaborated saliva, the calcium salts are found, held in solution through the agency of the carbon dioxid present. This calcic fluid is poured into the oral cavity where it comes in contact with acids derived from many sources. It has been proven that the salts of calcium as well as the carbon dioxid are very unstable. When the saliva is subjected to the air and to the ever-present acids of the mouth, the carbon dioxid is chemically liberated and the calcium loses its solubility and becomes a precipitate, which is deposited on the teeth and is commonly called tartar. Along with the precipitate various organic decompositions are mixed as it is deposited, and this becomes an irritant to the gums and incites inflammation.

The second form of irritation is found in the hard deposits of serumal calculus. This deposit is probably the most irritating and the most detrimental to the health of the peridental membrane. Barrett says, in his Oral Pathology, "The capacity of the blood stream for holding in solution the waste products of nitrogenous metabolism, the results of functional activity in the body, is determined by the alkalinity of the blood plasma. Any decrease in this diminishes its solvent power for these, and causes their precipitation in the tissues affecting the whole sanguinary current, or it may be localized in certain tissues; in the latter case there will be localized precipitation of the products of which uric acid is a type. Excessive work causes an increased blood supply to a part, and excessive oxidation and tissue acidity. The ligamentous tissues are especially liable to conditions of nature, and the peridental membrane of the tooth, through malocclusions, or by bad habits in mastication, by injuries from wedging, the application of ligatures, or other causes. The resulting hyperemia brings in its train over-nutrition, localized diminished alkalinity, with the consequent deposition of urates."

The object of touching on these superficial irritating substances is to call your attention to the fact that there must be irritation before inflammation, and inflammation before infection. All inflamed surfaces contain more or less bacteria which may be pathogenic and there are ever-present non-pathogenic bacteria.

I would be safe in saying that 50% of the dentists cannot diagnose a true case of pyorrhea, and nine-tenths of the medical men fall short of their knowledge of the infection.

To the practitioner, the infection known as pyorrhea appears as a slight gingivitis, at first, that is caused by the presence of some foreign deposits or substances, which will be found to be either calcareous or mechanical, and will come under the head of the irritants mentioned above. These deposits will be found lodged under the free margin of gum tissue, or on the roots of the teeth, and their presence is sufficient to cause the first irritation of the gingivæ. The irritation promotes inflammation, which extends to the cervix, or the point where the gum tissue and the peridental membrane come together. In following the membrane downward you will find small globules of pus studded about the peridental membrane, and in advanced cases these reach to the very apex of the tooth. The infection contains many and varied kinds of bacteria, which must be combated, and this cannot be done by the simple instrumentation which has been practiced by the profession for many years. It is true that a careful instrumentation is necessary in the treatment of the malady and a thorough prophylactic treatment carried on until the teeth and gums are in an aseptic condition.

The progress of any infection depends upon the resistance of the host, and the virulence of the infective organisms. The skin and mucous membrane afford barriers to micro-organisms. These barriers must be broken before an infection can take place, and even after this the bacteria are further combated by the protective elements of the blood, viz., antitoxins, lysins, agglutins, opsonins, etc. These elements are known as immune bodies, and the amount of these bodies in one's blood marks the degree of resistance toward disease.

An individual may be immune today and very susceptible tomorrow. No one can be said to be absolutely immune, for the resistance of a person may be lowered by a number of causes; by debilitating diseases, such as diabetes, rheumatism, tuberculosis, syphilis, or even by hunger and cold.

It must be borne in mind that one may be highly immune to certain bacteria, and extremely susceptible to another. One person may be immune to pneumococci, and possess a weakness toward some other. Vaccination for one class of disease, or bacteria, will not make the patient immune from the bacteria which produce another disease. Streptococcus vaccine will not produce immunity against a staphylococcus infection.

Many having given close attention to the study of pyorrhea infection, give the opinion that it is a localized infection, produced by organisms capable of producing pus. This is true in a measure, yet while it is localized so far as the teeth and gums are concerned it must be given credit for many systemic complications. I shall call attention to some of the complications which have come under the writer's observation.

Many writers, bacteriologists and others, claim that the amœba, or the endamœba, is the specific cause of pyorrheal infection. The investigations made by the writer and Dr. A. Melvill Crain, Johns Hopkins, give good reasons to discredit many of the statements made.

Case No. 1—Mrs L. came to me with a well-defined case of pyorrhea infection. Upon examining the mouth carefully a profuse discharge of pus was found about the necks of the teeth. In properly-arranged test tubes, in which culture media were placed, pus was introduced and sealed and placed in the incubator. In due time the bacteria were grown. Upon examination the general class of pus germs was found to be present (there being no amœba), but the germ in greatest abundance was the diphlococcus. An antitoxin was administered, together with proper instrumentation and the local and constitutional symptoms were eliminated.

Case No. 2—Mr. C. had been suffering with headaches for more than six years. Examination showed that he had two chronic abscessed teeth, with pyorrheal infection about the others, which was demonstrated by the cultures made. The abscessed teeth were extracted, and the balance of the mouth cared for by prophylactic treatment plus a vaccine injected twice each week for four weeks, and once each week for four weeks, when the patient was discharged with mouth in fine condition and headaches entirely eliminated. The vaccine used was determined by the cultures made from the pus found about the necks of the teeth and from the teeth extracted.

Case No. 3—Mrs. S. came to me with a chronic case of mouth infection· After examination I found one abscessed tooth and a well-defined case of pyorrhea about the rest of the teeth. The abscessed tooth was extracted and cultures made from the sack at the apex of the root, and the culture found in this case tallied with that made from the other infected teeth not abscessed. This case was suffering from an acute arthritis, and the pains seemed to extend from the mouth to the knee joints. Upon examination of the pus, vaccines were used, general instrumentation was resorted to, and local treatment given, and immediate relief resulted. In the first two weeks the pains were all gone and in a few months, local treatment at intervals of ten days, the gums returned to their normal condition and color, and the teeth tightened in their sockets. Cultures made of the debris found in the mouth after six weeks showed no virulent pathogenic condition present.

Case No. 4—Mrs. N. was brought in with rheumatism. Not being able to walk alone, was assisted to the chair and an examination made of the mouth. Cultures made from pus from about the teeth showed the presence of diphlococci, streptococci, staphylococci, diphlococcus rheumaticus, typhoid baccilli, tubercular bacilli and amœba. The teeth in this case were beyond all help, and they were held for some time for the sake of study. Later they were extracted and in breaking open the teeth it was found that the patient had been suffering with pulpitis in each and every tooth of the dozen extracted. Vaccines had been used prior to the extraction which assisted only in a temporary manner, but upon the removal of the teeth the rheumatism disappeared.

The idea of presenting the foregoing cases is to show that all cases of mouth infection, or pyorrhea, are not caused by the presence of amœba as has been claimed. If this was the case and one learned how to kill amœba, and his case showed up with diphtheria germs, he would be at a loss to know what to do. To carefully meet all cases, one must study the bacteriology of each and every case and apply the remedy for the case at hand. There is no specific for pyorrhea or mouth infection. Each case must be treated as its diagnosis shows it should be treated, for it is not always wise to use the same remedy for a cut that one would employ in treating a burn.

A Wise Compromise

I do not wish to mitigate in the slightest degree the importance of the restoration of the occlusal surface and the treatment of the approximal surface so as to insure the cleansing by the free movement of food through the embrasures bucally and lingually instead of into the approximal space. But we make a great many operations upon teeth which have been seriously weakened by decay. In some of these the cusps are prominent and the interdigitation of the opposing cusp is deep, and the weakened tooth—you have all seen it—will sometimes break under the grinding force of mastication. Perhaps it is simply soft bread that does it. They say teeth break oftener on soft bread than eating hard things or chewing meat, and I think it is true. In some of these cases I think it is worth while to sacrifice a portion of the masticating efficiency for the sake of diminishing the risks of breakage. You may do so partly by shortening the cusps, partly by neglecting quite so perfectly to restore the depth of the sulci and so greatly diminish the probability that your tooth will come back by-and-by with the lingual or buccal side split off.—Dr. Edmund Noyes, *Dental Review*

A STUDY OF CEMENTUM*

BY W. C. STILLSON, D.D.S., CLEVELAND, OHIO.

WHEN I WAS ASKED by the program committee to prepare a paper for this meeting, it occurred to me that a discussion of the subject of cementum would be of special interest, because of the fact that the attention of the profession is at present so keenly directed toward the roots of teeth and adjacent tissues, and to the normal and abnormal changes occurring there. The problem of the relation of oral foci of infection to systemic diseases is so vast that years may elapse before every phase of it has been solved. We should congratulate ourselves upon the excellent work that has been, and is at this moment being done along this line, under the direction of the Research Commission of the National Dental Association. In order to understand thoroughly and interpret correctly the results given us, we need not only a thorough and definite knowledge of the anatomy, histology and pathology of the tissues within the mouth, but of the entire system as well.

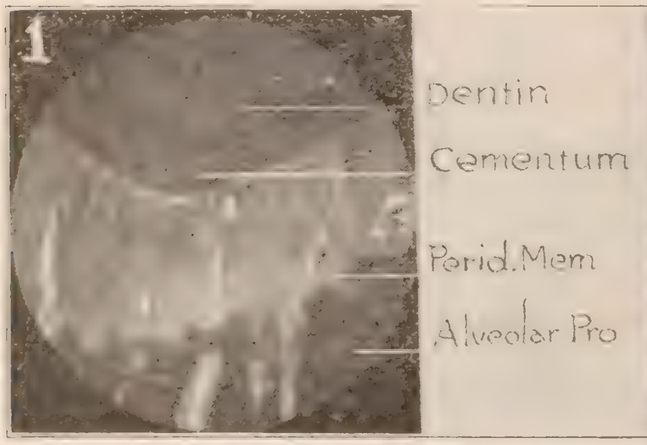

Figure 1. Photomicrograph of tip of root and surrounding tissues. 100x.

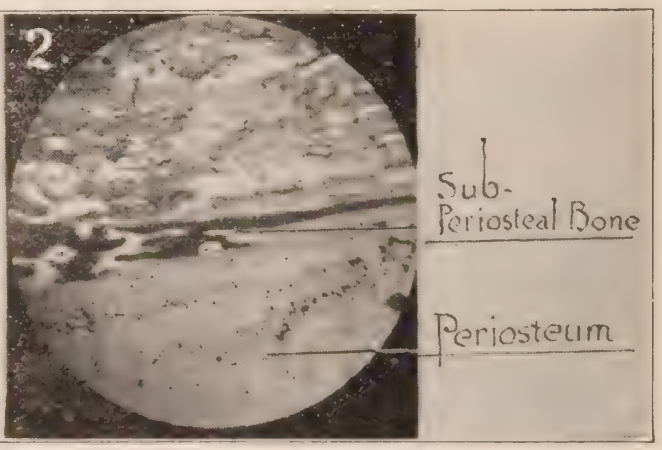

Figure 2. Subperiosteal bone from pig embryo. 100x.

It was with the hope that I personally might gain a clearer understanding of the structure and changes occurring in the region of the roots of teeth that, some time ago, I set about the task of making ground sections of extracted teeth, especially those which seemed to be of pathologic interest. And may I say before going on that I feel that this study I have undertaken is only begun, and that had a few weeks or months more elapsed before giving this paper, I might have had more to present.

IMPORTANCE OF CEMENTUM

To discuss cementum without reference to its surrounding tissue would be much the same as discussing bone without reference to the periosteum, or cartilage without reference to the perichondrium. Cementum is in every way a specialized tissue, and its function is to build in and attach to the tooth the fibers of the peridental membrane. Its importance can be fully appreciated only when its function is thoroughly understood, for without the attachment of the peridental membrane the tooth could not be retained, no matter how perfect its condition otherwise.

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*Descriptive Clinic at Northern Ohio Dental Society, 1916.

Figure 1 is a photomicrograph of the apex of a root and surrounding tissues, showing the dentin, cementum, peridental membrane and bone.

COMPARISON OF STRUCTURE OF BONE AND CEMENTUM

The structure of cementum is usually compared to subperiosteal bone. *Figure* 2 is taken from a section of developing bone, and shows typical subperiosteal bone. *Figure* 3 is a higher magnification of the central strip of bone in *Figure* 2. Note the periosteum, with its layer of osteoblasts actively engaged in the formation of bone. The periosteum of bone in this region is really much thicker than shown in this illustration, the outer or fiberous tissue not being included. Here and there may be noted an osteoblast which is apparently being drawn over to the bone substance. From this may be gained an idea of the way in which the osteoblasts become bone-cells and are included within its substance.

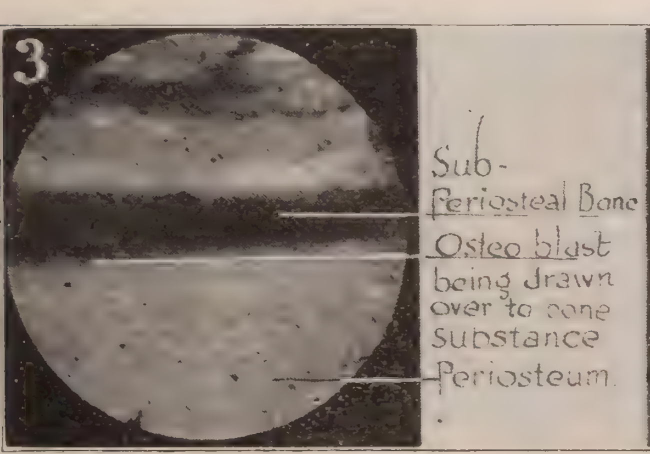

Figure 3. Subperiosteal bone from pig embryo. 440x.

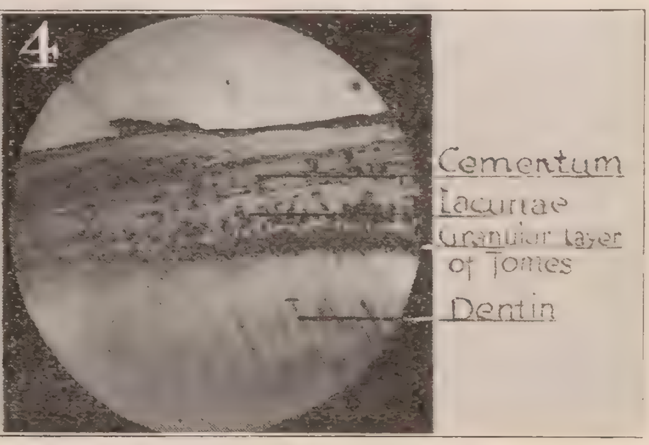

Figure 4. Photomicrograph of the side of the lingual root of an upper first molar from a man aged forty-five. 100x.

Note also the regularity of arrangement of the lacunæ within the substance of the bone. If this section was prepared in such a way as to show us definitely the lamellæ or layers of the bone as formed, we would see that, generally speaking, the lacunæ lie between the layers and not within them. Note also the apparent uniformity in size and shape of the lacunæ. They are oval in form, the long diameter being parallel with the long axis of the bone.

Figure 4 is a photomicrograph of the side of the lingual root of an upper first molar, from a man about 45 years of age. Note the stratified appearance of the cementum, which indicates that it has been deposited by the action of the cementoblasts of the peridental membrane in layers, one upon the other. These layers or lamellæ are not as regular as would be found in bone, especially Haversion-system bone. This picture was taken from the end of the root, and the cementum of this region is always considerably thicker than in the gingival third. This difference in thickness is not supposed to be due to the fact that more layers are present in the apical portion, but that the thickness of each individual layer is increased as the apex is approached, thereby increasing the thickness of the whole. Note particularly in this field the size, form and position of the lacunæ as compared with subperiosteal bone. There seems to be no uniformity of arrangement or position. They may occur between the layers or within the layers, and generally are not found at the extreme outer surface. They are more numerous in the gingival than in the apical region of the root. The canaliculi also are more irregular in arrangement, but in a general way they extend from the lacunæ toward the outer surface. Note the position of the granular layer of the Tomes and the ending of the tubules of the dentin within it.

Tomes described Haversion canals in cementum, but Noyes denies their existence. He says: "For the last fifteen years the author has had under personal observation, each year, not less than two hundred longitudinal sections and three hundred transverse sections of the root ground from human teeth, and in that time has never seen what could be called an Haversion canal."

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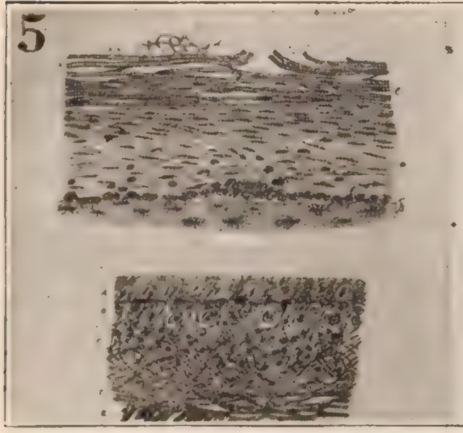

Figure 5. The upper illustration shows the formation of bone beneath an unattached periosteum. The lower illustration shows attached periosteum. (Black)

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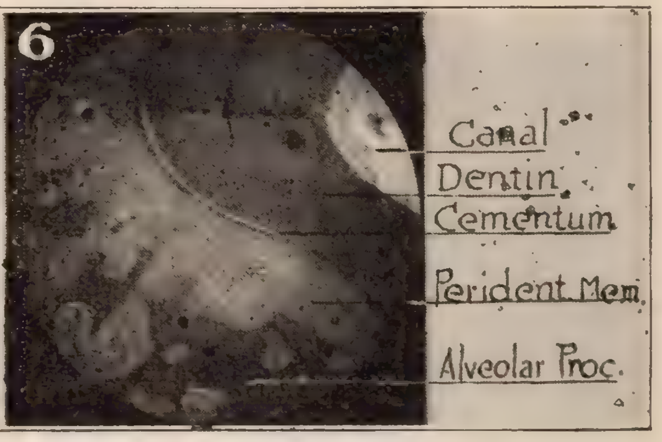

Figure 6. Photomicrograph of side of a root showing adjacent tissues. 100x.

Some authorities also describe a communication between the lacunæ of cementum and the granular layer of Tomes of the dentin. This also, Dr. Noyes claims, he has been unable to confirm, and describes the inner layer of cementum as clear and apparently homogenous. I bring out these points here because I wish to call your attention to this fact later in the study of the nourishment of this tissue.

COMPARISON OF FORMATION OF BONE AND CEMENTUM

The upper illustration, *Figure* 5, taken from Dr. Black, shows the formation of bone beneath an unattached periosteum. By "unattached periosteum" we mean simply a covering sheath to which there is no attachment of tissue externally. Note the osteoblasts engaged in the formation of bone. Observe also the fibers running parallel with the long axis of the bone in the fibrous layer of the periosteum, and particularly that none of these fibers penetrate the bone substance. Penetrating fibers are unnecessary in unattached periosteum, since there is little mechanical strain upon it.

The lower illustration, *Figure* 5, also taken from Dr. Black, shows attached periosteum; and by "attached periosteum" is meant simply periosteum to which the tissues are fastened externally in such a way as to place upon it considerable mechanical strain. Here we have the fibers of the periosteum penetrating the substance of the bone. They are built into its substance by the action of the osteoblasts, which calcify the matrix of firm bone around them. Tomes says that these fibers are not calcified but embedded into the bone. These are commonly called the "fibers of Sharpe"; and my object in showing these drawings from Black is, to make more clear if possible the process employed by nature in the building of the fibers of the peridental membrane into the cementum, and to show that this process is impossible without perfect physiologic action on the part of the peridental membrane.

The photomicrograph *Figure* 6, (transverse section through tooth and tissues), again shows the peridental membrane in its attachment to the root of a tooth and to the alveolar process. Bear in mind the fact that cementum within itself has no power of change or repair, and is entirely dependent upon the peridental membrane. The strong bands of connective tissue fibers of this membrane, which correspond to the "fibers of Sharpe", of bone, are built into the substance of the cementum and attached to it through the agency of the cementoblasts. In this process, the cementoblasts act very similarly to the osteoblasts of bone.

Figure 7. (Black)

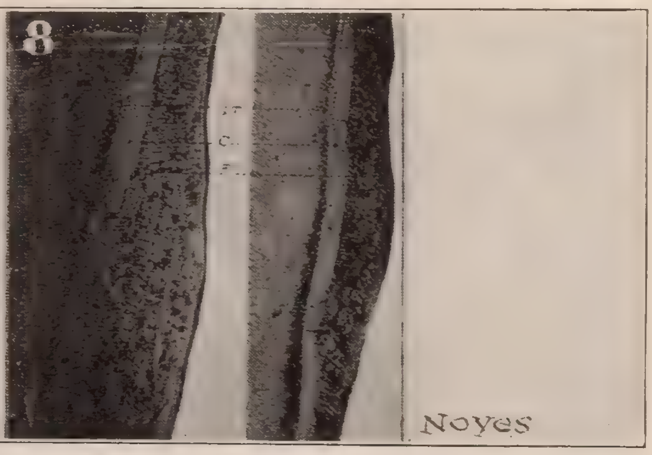

Figure 8.

The building into cementum of the fibers of the peridental membrane may be likened to the building of a pillar of solid concrete which has a frame work of long steel rods. The steel rods or supports of the column correspond to the fibers of the peridental membrane, while the concrete when poured around them resembles the solid calcified matrix of cementum. And if at any time or for any reason the fibers of the peridental membrane are cut away from the surface of cementum by the action of the osteoclasts, or bone-and-cementum-destroying cells, or by the presence of poisonous or infectious material, the only way possible for the fibers to again become attached is by the formation of a new layer of cementum.

It should be remembered also that the formation of cementum is more or less a continuous process. It begins just before the tooth erupts and continues, with periods of intermission throughout life, regardless of the vitality of the pulp.

Figure 7, an illustration, taken from Dr. Black, shows more clearly the action of the cementoblasts in building the fibers of peridental membrane into the cementum. The lower left drawing (*Figure* 7) gives an idea of the shape of the cells.

The lower right drawing, *Figure* 7, shows the position of the cells around the ends of the fibers in a section cut horizontal to the surface of the root

Figure 8 is taken from Dr. Noyes, and shows the penetrating fibers of the peridental membrane built into the cementum.

COMPARISON OF THE NOURISHMENT OF BONE AND CEMENTUM

Figure 9 is a photomicrograph of a longitudinal section of bone. Note the Haversion canals running lengthwise of the substance of the bone. In describing the nourishment of bone I will quote from an eminent histologist: "The blood vessels of bone pass into it from the periosteum. Near the center of the shaft of a long bone a canal passes obliquely through the compact bone. This is known as the nutrient canal and its external opening as the nutrient foramen. This canal serves for the passage of the nutrient vessels, usually one artery and two veins, to and from the medullary cavity. In its passage through the compact bone the nutrient artery gives off branches to and the veins receive branches from vessels of the Haversion canal."

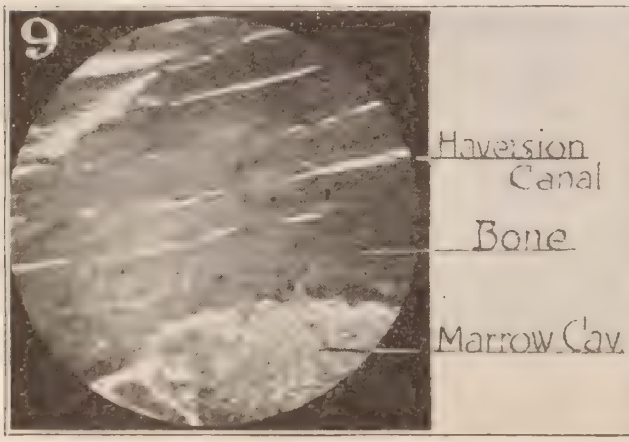

Figure 9. Photomicrograph of a longitudinal section of long bone. 100x.

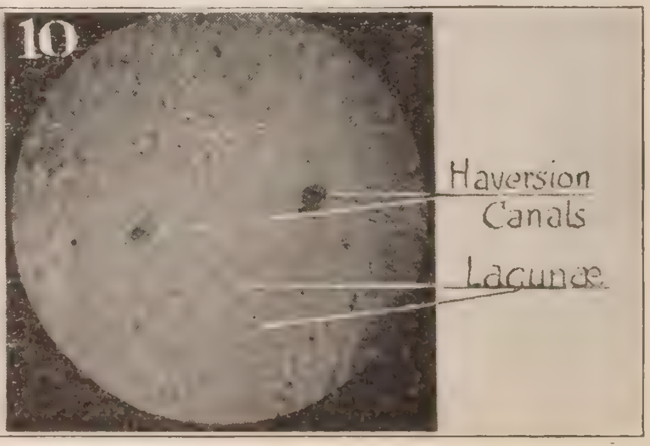

Figure 10. Photomicrograph of transverse section of long bone. 440x.

Figure 10 is a photomicrograph of a transverse section of bone. It is a higher magnification than *Figure* 9. Note the Haversion canals cut at right angles to their course, and the relationship of the lacunæ and canaliculi to them. Now to quote further from the same authority: "The lacunæ and canaliculi constitute a complete system of lymph channels, which communicate with the lymphatics of the periosteum, of Volkmann's and the Haversion canals, and of the bone marrow."

From these studies we see that the nourishment of bone is of a comparatively high order, and that it contains within itself all the elements and powers of repair. Osteoclasts may appear within its substance and remove a portion and this may again be rebuilt by the osteoblasts. In fact, very, very often in the life of bone, these processes proceed simultaneously without dependence upon the surrounding tissue.

In the case of cementum no such processes may go on within its substance. *Figure* 11 is a photomicrograph of the side of the root of an upper cuspid. Cementum is entirely void of Haversion canals or of any circulation of blood, and is dependent absolutely upon the peridental membrane for its nourishment. The osteoblasts of bone are arranged more or less systematically, and their canaliculi communicate with each other. In cementum the lacunæ are so irregular in position and in the arrangement of their canaliculi that certainly little communication could exist between them.

Dr. Noyes speaks of the vitality of the cement corpuscles (which are simply cementoblasts within the lacunæ), but states that the exact relationship of these cells to the matrix of cementum as well as the exact relationship of the osteoblasts of bone to their matrix is not well understood.

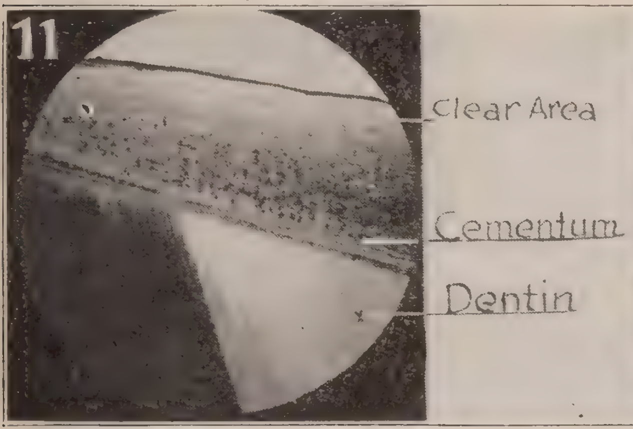

Figure 11. Photomicrograph of the side of the root of an upper cuspid. 100x.

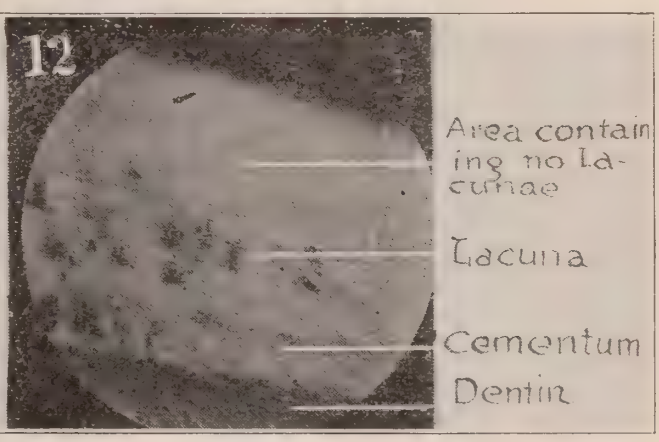

Figure 12. Photomicrograph of a section of apical cementum. 440x.

It is certain also that its nourishment does not come from within, for we know that the life of cementum is maintained though the pulp be removed.

It seems certain that this tissue receives its nourishment through the peridental membrane by the process of osmosis, diffusion or infiltration.

Figure 12 is a high magnification of a section of apical cementum (from the same root as *Figure* 11) and illustrates the position and relationship of the lacunæ to the surface.

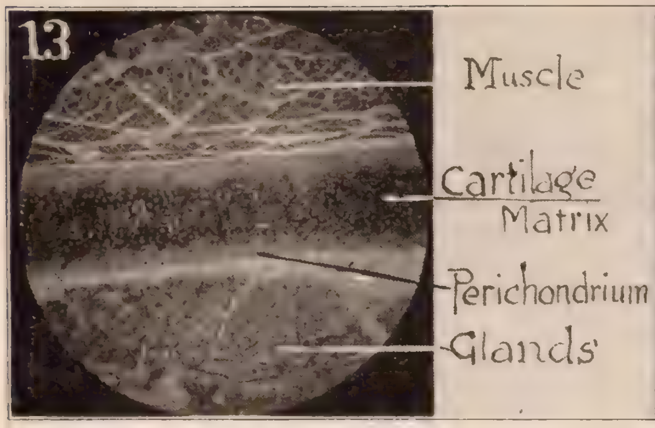

Figure 13. Photomicrograph of a section of cartilage from the larynx. 100x.

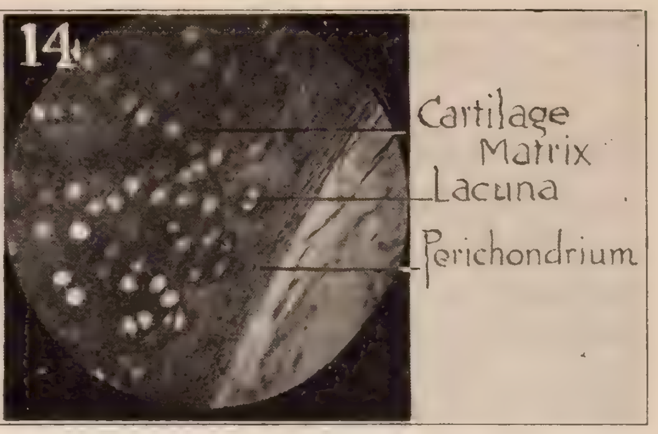

Figure 14. Photomicrograph of cartilage matrix and perichondrium. 440x.

Figure 13 is a photomicrograph of a section of cartilage from the larynx.

Figure 14 is a higher magnification of the cartilage matrix and perichondrium. Cartilages are also avascular, and entirely dependent upon their surrounding tissue, or the perichondrium, for their nourishment and growth.

Figure 15 is a photomicrograph of a section of stratified squamous epithelium, lining the mouth.

Figure 16 is a higher magnification of the epithelium. Epithelial tissues are also avascular and dependent entirely upon their underlying tissues for their nourishment and growth. I am showing these slides simply to call your attention to the fact that many other tissues within the body receive their nourishment in a very similar way to that of cementum.

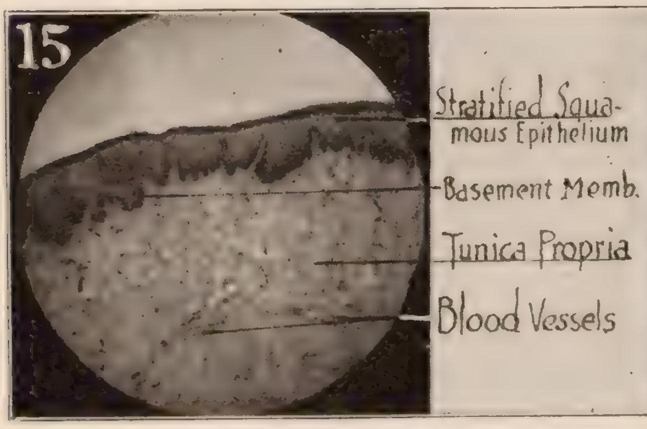

Figure 15. Photomicrograph of stratified squamous epithelium lining mouth. 100x.

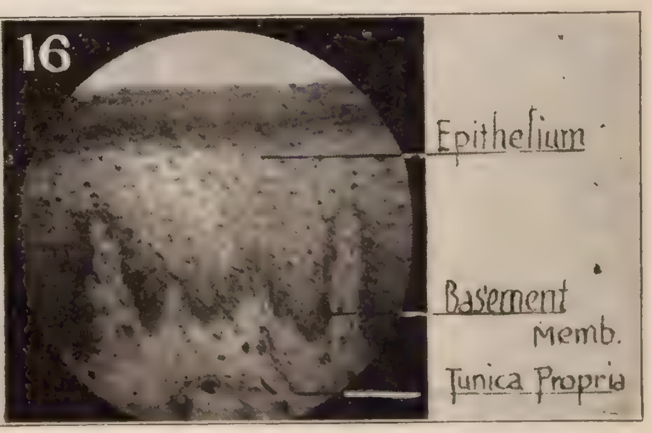

Figure 16. Photomicrograph of epithelium lining mouth. 440x.

ABSORPTIONS OF CEMENTUM

Absorption of cementum is normal in the case of temporary roots, and there is no inflammation about the process. In bone this tearing down and building up process is always in progress without sign of inflammation. Normal absorptions occur upon the roots of permanent teeth, very often due to change of position. This is accomplished by the osteoclasts and often involves even the dentin. Repairs are again made by the cementoblasts rebuilding layer upon layer of cementum.

Figure 17 is a photomicrograph of the side of a root and shows an absorption area which has been repaired by the rebuilding of cementum. The dentin was involved in this absorption.

Slight absorptions occasionally occur upon the sides of roots of permanent teeth. These are small and well defined, and repaired by rebuilding of cementum so long as the peridental membrane remains healthy. Dr. Black reports two cases where all the roots of the permanent teeth were absorbed, accompanied by no other symptoms than the loosening of the teeth.

PRACTICAL CONSIDERATION.

My efforts to review the structure, formation and nourishment of cementum have been made wholly because of the importance of bearing these facts in mind at all times, in our efforts to correct diseased conditions about the roots of teeth. While many, many problems confront us in the treatment of teeth, we must not loose sight of the fact that the final success of all treatment will depend largely upon our ability to restore the cementum, peridental membrane and the alveolar process to a healthy condition. It is as important to know what cannot as what can be done.

Figure 18 is a photomicrograph of part of the apex of a lower third molar root which had been abscessed for some time.

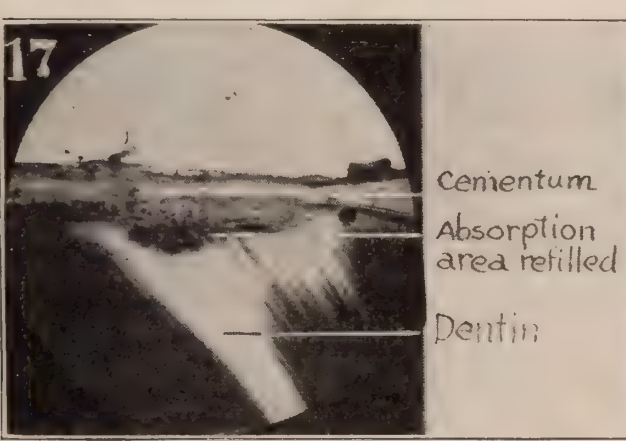

Figure 17. Photomicrograph of the side of a root showing an absorption area which has been repaired by the rebuilding of cementum. 100x.

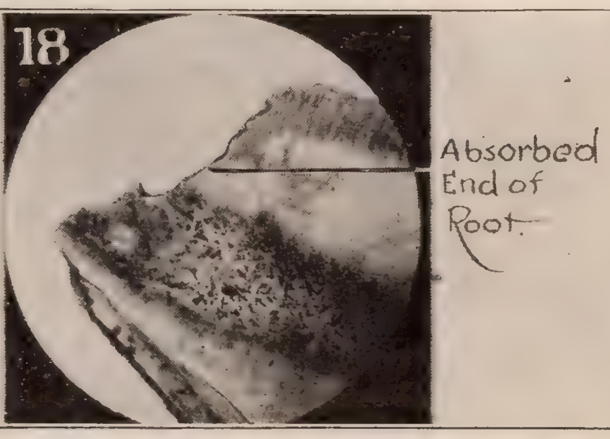

Figure 18. Photomicrograph of part of the apex of a lower third molar root which had been abscessed for some time. 100x.

If in a pyorrhea pocket or apical abscess, the peridental membrane is stripped from the root over a certain area, and if this surface of the root is bathed in pus for a considerable length of time, it is reasonable to suppose that the matrix of cementum is saturated with it. It is certain that the death of the cement corpuscles has occurred just as would occur in the osteoblasts of bone. In the case of bone necrosis nature makes an effort to cast off the diseased tissue. Cementum has no power of repair within itself, and if necrosis of cementum actually occurs the necrotic area must be removed surgically or good results will not follow. I believe that many times the only way possible to remove necrotic cementum is by removing the tooth.

Again, it should be remembered that if by instrumentation upon the side of a root or by apicoectomy, necrotic cementum is removed, it can never be replaced unless the cementoblasts of the peridental membrane again become active and deposit new layers of cementum upon the root. And in cases where a chronic abscess has existed about the root of a tooth the cementum, the peridental membrane, and often large amounts of bone are destroyed. I believe that in the majority of these cases the prospects of a new deposit of cementum are very poor.

Dr. Black speaks of three things which may occur after a root resection:

First: In the absence of infection the tissues may attach themselves to the end of the root.

Second: The cementoblasts from the sides of the root may gradually build new cementum over the end.

Third: The tissues may simply heal over the root and without being attached to it. It is his opinion that this last is what usually happens.

The treatment of either a pyorrhea pocket or alveolar abscess is after all largely a biological question and not as much a matter of the kind or amount of certain drugs, excepting as these drugs are used to stimulate normal cell activity.

Wade Park Ave. and 105th St.

PRESIDENT'S ADDRESS*

BY WALTER G. HUTCHINSON, NASHVILLE, TENN.

IT GIVES me great pleasure to welcome you all to this our 49th annual meeting. I have enjoyed serving you as president for the past year. Your officers, with the assistance of committees, have diligently worked to give you a live meeting. Too much praise cannot be given to the essay and clinic committee for the excellent program which you have before you. You will find new subjects brought to your attention and everyone should derive a great benefit from the papers which are to be read.

I have introduced the symposium idea and, if it is as successful as I anticipate, it will be carried out in future meetings. This year, the symposium will be on Focal Infection. Each essayist has selected one phase and will limit his discussion to that part, to wit: Etiology, Diagnosis, Clinical-X-Ray, Effect on Joints, Heart, Kidney and other Organs, Treatment and Prognosis.

The arrangement committee has been very successful in providing for your comfort and convenience.

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*Read at the Tennessee State Dental Society, June, 1916.

At an informal meeting of Memphis dentists, on June 24, 1867, it was decided to lay plans for the formation of the State Dental Association of Tennessee. Drs. J. C. Harris, W. T. Arrington, and F. W. Garkey were appointed a committee to send out invitations to the dentists of the State, asking them to meet in Nashville. As a result of this call, on July 26, 1867, there was a meeting held in the office of Dr. W. H. Morgan, on Church St., Nashville, at which time the State Dental Association was formally organized. Next year, being our 50th anniversary, your president has appointed the following committee: Drs. H. W. Morgan, J. A. Cottrell, and J. L. Mewborn, to present to you a history of the Association.

I beg to call to your attention some points of interest which have happened in the past few years, and others to be accomplished in the near future. One of the greatest moves in our profession was started several years ago by a few members of the National Association, towards the organization of a National Research Institute. This has grown to such an extent, through the subscriptions of dental associations and members, that a Home has been purchased in Cleveland, Ohio. Here the dental profession is really helping itself, and not depending on medical laboratories and manufacturers' statements. We now have a research laboratory all our own and reports are being made to you through the National Association and its magazine. All of you are members of the National and get the magazine. Let me pause a moment to show you what the States are doing for this work.

Contributions by states:

Colorado	$ 500.00
Connecticut	50.00
Georgia	925.00
Illinois	680.00
Iowa	1,555.00
Kansas	660.00
Maryland	500.00
Massachusetts	110.00
Michigan	100.00
Minnesota	100.00
Missouri	672.50
New Jersey	5 00
New York	790.00
Nebraska	1,211.50
Ohio	15,668.89
Oklahoma	410.00
Pennsylvania	450.00
South Dakota	15.00
West Virginia	291.00
Special contribution from the assigner of property	2,500.00
Total	$27,193.89

You can see by this statement that Tennessee, as an Association, has not yet contributed, although we are getting the benefits each day. A few members have subscribed towards this great work.

Some of us a few years ago, looked upon the X-ray as something very dangerous and only to be handled by the specialist and the M.D. Today, every practitioner should have an X-ray at least within his reach.

Conductive anesthesia has come to us and wonders are being accomplished in alleviating pain.

We cannot help but notice the great work our confreres are doing in the great war that is now raging. The excellent results being accomplished has brought forth the highest praise from medical men and has also been noted by the heads of the warring nations. Dr. Crile who recently visited the great battle field, says: "A high tribute should be paid the American dentists, who are doing the best surgical work I ever have seen, replacing teeth, moulding jaws, treating fractures, and correcting deformities."

Some of the officers of the National Dental Association, realizing the need of dental surgeons in time of war, have organized a Preparedness Association and have called for volunteers. It is generally known that school children cannot do their work properly unless the oral cavity is in good condition. Likewise a soldier's mouth must be in perfect condition before he can successfully undergo the strains of a hard campaign. Today a large percentage of applicants for service in the army and navy are turned down on account of defective teeth. The Preparedness Association asks that each member pledge himself to place in good condition the mouth of at least one applicant, free of charge. They agree to see that its members are not imposed upon. Now, gentlemen, this seems a small thing to do for one's country, especially at this time, when we are on the verge of war. Let those who have not yet joined, do so at once.

In closing, let me recommend the following:

1. That each member of this Association pledge himself to be present at our next meeting, and see that other members in his county are present also.

2. That each local society become a component of the State Association.

3. That the Tennessee State Dental Association lend its assistance, as an Association, as well as individuals, to the National Research Institute.

4. That the Legislative Committee take up the advisability of amending our dental law to provide for dental nurses.

5. That the History Committee better perfect its organization.

I wish to thank each of you for the active interest you have taken in the Association and its work. I also wish to thank you for the distinguished honor conferred upon me at our last meeting, by electing me to the presidency of our Association. This honor I have endeavored, so far as I was able, to merit. May each year find this Association more closely knit together, more earnestly engaged upon the highest interests of our profession, and more and more, which indeed it already has become, a power for good in our commonwealth.

RESTORATION OF PORTION OF MANDIBLE AFTER RESECTION*

BY S. K. DAVIDSON, D.D.S., MEMPHIS, TENN.

I WILL give you the details of the *appliances* that I used in a case of restoring a lost portion of mandible, cause of removal being necrosis from an infected tooth.

History of the case is that of a man forty-five years of age. The first lower left molar, causing trouble, as near as can be ascertained, had nerve devitalized twenty-five years ago, and filled with a large amalgam filling, giving no trouble prior to infection which resulted in removal of a section of the mandible last October.

Six years ago, when I was doing work in a general way for this patient, I found the tooth considerably broken down around the filling, and thought best to crown it, which I did, on August 15, of last year. While the patient was visiting in the east, he woke up to realize the fact that all that had been reported dead was not dead, and suffered the tortures of the lower regions before the dawn of day, when he could look up a dentist for relief. Upon visiting the dentist, the crown was removed and assurances given that pain would soon be gone. After twenty-four hours of agony, with swelling of the whole side of the face, he returned to the dentist, determined to have the tooth extracted, which the dentist readily consented to do, and, as the patient thought at the time, removed all of it. No relief was given, pain increasing each day for four days, he returning to the dentist for treatment. Face had swollen to almost bursting point when he changed from the dentist to a surgeon, who succeeded in getting drainage to some extent internally. After ten days treatment, the surgeon made incision externally, obtained a fairly free discharge through opening. Relief was given to the extent that the patient decided to come home for further treatment.

After arriving in Memphis, it was discovered that the roots of tooth had not been removed, and they were taken out, hoping that all would be well in due time. Where the external incision had been made, it remained open with a discharge, all the while having been packed with gauze. There had been no special annoyance in the use of the jaw, or in mastication, till about thirty days from the starting of the trouble, when all of a sudden there seemed to be a giving away and appeared to be severed at point of trouble, and he was not able to use jaw with any comfort. He then went immediately to a surgeon and had an X-ray made, showing necrosis in separated condition.

Operation was advised and performed, taking away a triangular piece of the maxilla, a little wider on alveolar border than space of the molar, and widening to about one and three-fourths inches at lower line of jaw. The two ends remaining, had necessary attention by scraping and chiseling away the diseased bone and wound dressed without a semblance of a splint to hold the jaw in proper relation for occlusion.

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*Read before the Tennessee State Dental Society, 1916.

Five weeks after the operation of removing necrosed bone, patient came to me to see if there could be something done for his condition. As the contraction of the muscles had drawn the maxilla backward, till the space of the lost tooth had about closed and the occlusion very much off, and mastication impossible. The anterior tooth when occluded, the best the patient could do, was far from correct. My models will show the condition when it was presented to me for treatment.

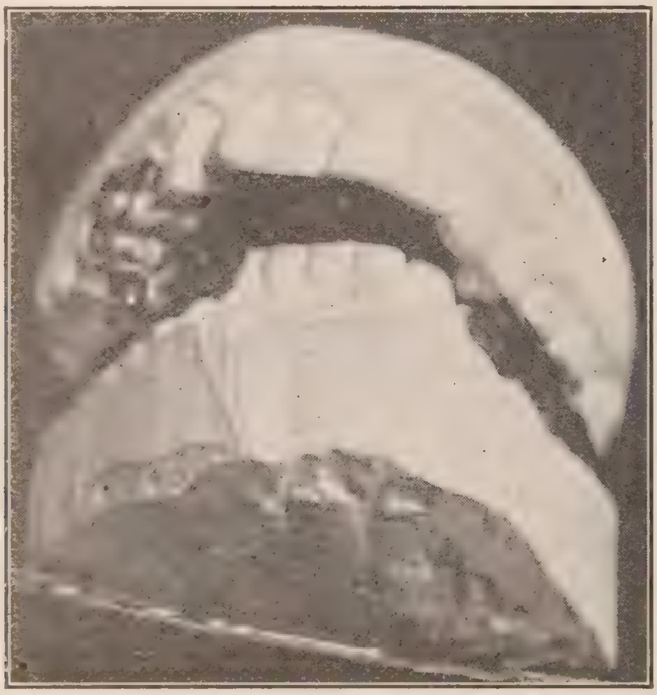

Fig. 1. Showing mouth closed, molars on left occluding.

There was no way of determining whether the periosteum had been destroyed to the extent of prevention of restoration of the lost structure, but to my mind the thing to do, was to place the jaw in normal position, and construct a splint to place on the teeth to hold the jaw firm and positive for sufficient time for the reproduction of removed bone, before grafting should be attempted.

I first made two good plaster impressions of the lower and one of the upper, and from the lower Mellot's metal models were made. Over one of these I constructed a double jack, swinging from two strong bands fitted to the molars and soldered together. On the anterior side of the second molar band, two flattened pieces of tubing were soldered, one buccally, the other lingually, for the rear ends of jack to rest in. Two bands were fitted and soldered together for bicuspids. On the bicuspid bands I soldered a piece of tubing on either side, buccally and lingually, for threaded end of jack to pass through; behind these pieces of tubing were the nuts of jack.

These bands were cemented in place, tension started on jacking anterior portion of maxilla to its proper position for the correct occlusion. I naturally thought that when the space was obtained by throwing the jaw forward, occlusion would follow, but to my amazement it was not so. The more I jacked, the greater space I had between the teeth, forward of the resection, and in front especially.

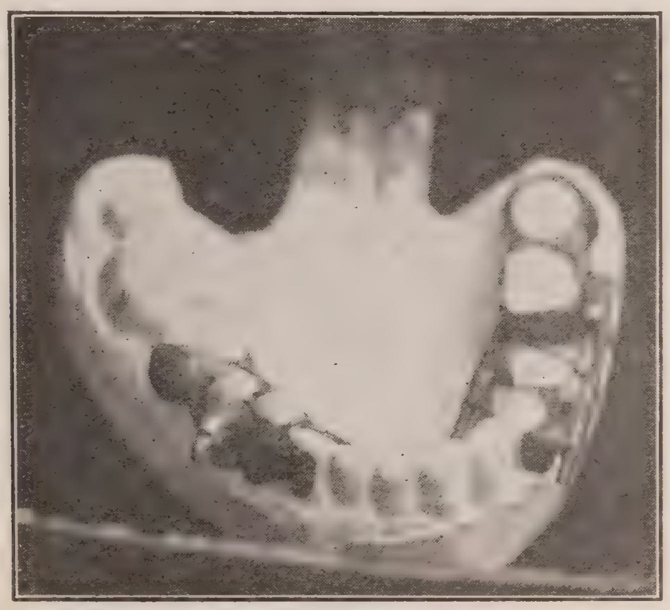

Fig. 2. Jack in position.

When the mouth was closed naturally, the two molars back of resection, strange to say were not at first, nor ever did get out of proper occlusion. When I judged I had space desired, the teeth on the right side in cuspid regions lacked fully an inch of occluding with the upper.

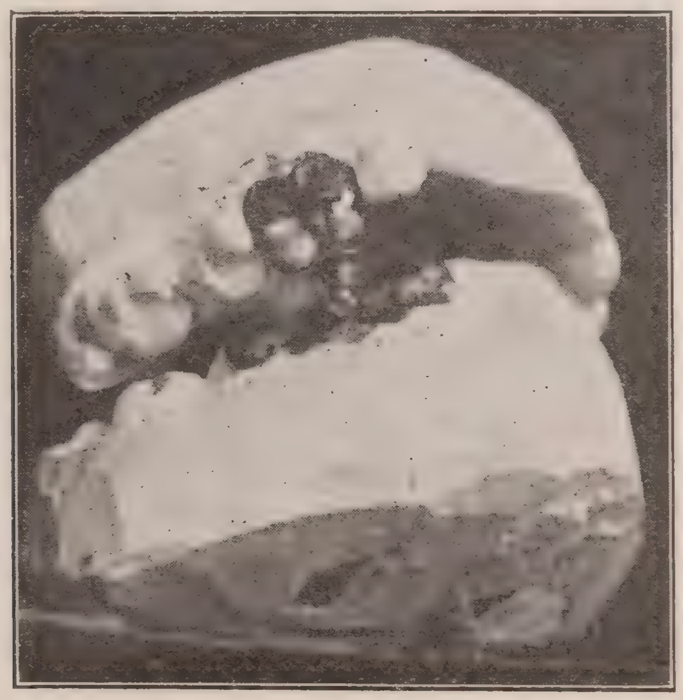

Fig. 3. Appliance used to draw teeth to occlusion.

My next appliance was to make something similar to a retraction screw, in order to pull the teeth together to occlude properly, which was a failure. It worked nicely on account of the strong pulling power, but the threads were spent before an occlusion was obtained. I then made another which did the work.

You who have not had experience in handling of contracted muscles have no idea of the rigidity they have. It seemed at times I exerted enough power to pull the three teeth out of their sockets, without the muscles giving perceptibly. After finding the muscles so rigid, and the tension so great as to carry the jaw backward, then my plans for the construction of a splint to hold the jaw in rigid position had vanished, as I intended to make a one-piece splint, embracing the two molars, bicuspids and cuspid, allowing a free use of the jaw. Now with the splint in two sections, was I felt, the only way to make it to get the results desired.

Using my other model for this work, I sawed the model in two, at point of resection, and occluded the two pieces of model to upper, and held in that position; made the posterior half of splint of two gold bands to each of the molars, soldered together with a square anterior abutment, with three teeth banded for anterior half with posterior square abutment. These two pieces in position on model, left a space between the abutments of about one-fourth of an inch.

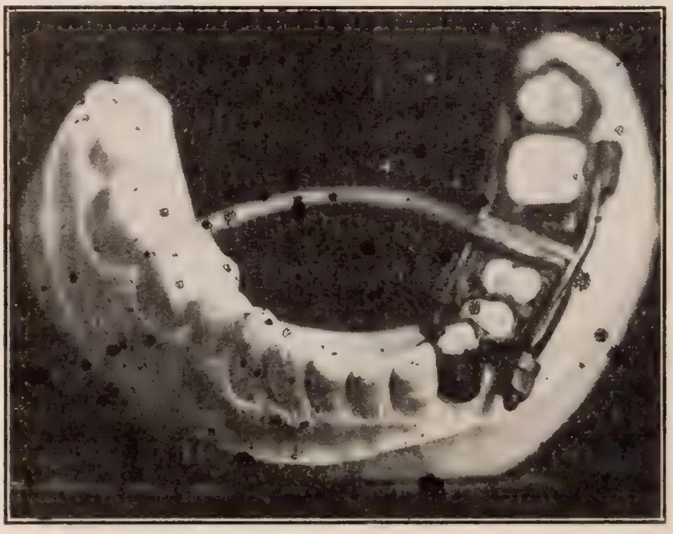

Fig. 4. Splint occlusal view.

On either side, buccally and lingually, of the two pieces of splint, I soldered a grooved or U-shaped piece of gold in alignment with each other, as near as I could, to engage a flattened bar of clasp metal which was on the order of a bolt, a hooked head on one end and nut on the other. I fitted the bolts in slots so as to go down well to bottom of slots, and then filled in with as many metal shims as was required to fill in the space between the square abutment, so that when the nuts were tightened, it made the splint as if in one solid piece. This enabled the two halves to be cemented on separately and cement to thoroughly harden before any stress came on the splint at all.

The posterior went on first. On cementing the anterior I had difficulty in holding the space open, so that the square abutment would pass the other half, as the muscles drew the jaw backward so strongly. After cement was well set, I then put in bolts and worked in my shims by malleting till I had the number intended in the construction. I did not screw the nuts up on bolts till the jaw was brought up together, as my splint was made for it to go. I drew it up with appliances on opposite side as before, then I tightened the nuts on the outside, let it go over a few hours before loosening the jaw for opening mouth so as to get to inside nut. Aside from a little clumsy feeling to patient, of bulkiness of splint, the patient experienced no discomfort at all, and could masticate as well as ever before, notwithstanding I cautioned him to go carefully, which he did not do.

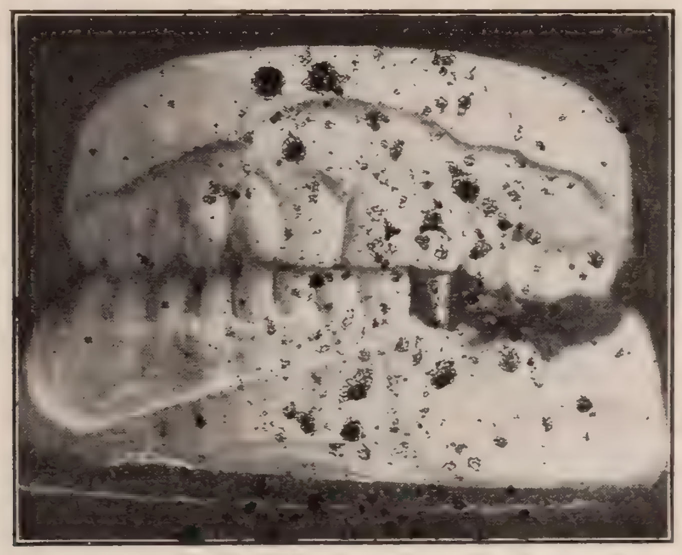

Fig. 5. Splint in place with mouth closed.

The splint remained on eighty-four days all intact, which was a much longer time than I thought was needed, but there being no discomfort, the removal was delayed longer than would have been otherwise. After removing the splint, I put on a bridge, crowning molar and second bicuspid.

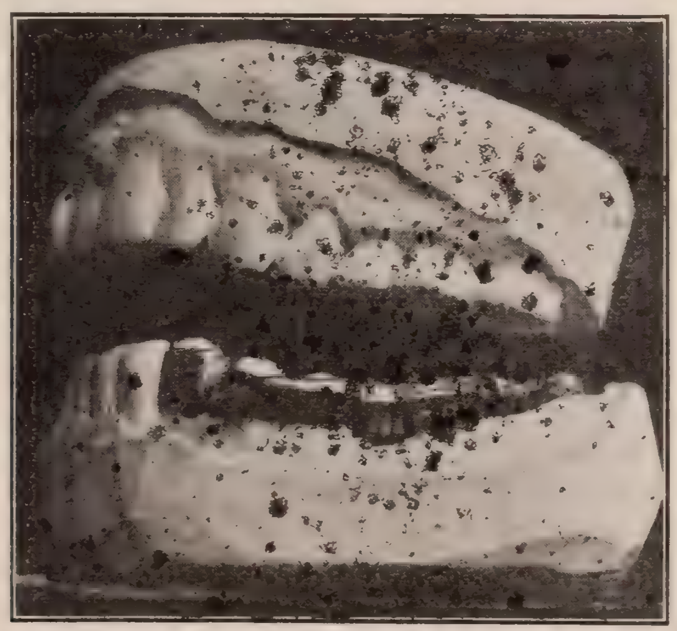

Fig. 6. Splint in place from buccal view.

I found the nerve in bicuspid dead. The other teeth posteriorly to median line may be in same condition. Have not made test to see. The destruction of so much bone around the bicuspid may be the cause of death of it. It was very loose when I started the work.

DISCUSSION

Dr. W. E. Lundy, Memphis: I happened to be present when Dr. Davidson had this case on hand, and I fully realized just how helpless one is when confronted by some such condition If there was some one else that you could send them to and free yourself of it, like we do in many cases, it might be a matter of very little importance But when an M. D. comes and reverses the thing, and puts it up to the dentist to do something, it is a very different state of affairs. In this particular case we had lost so much bone that to hope to gain good union, after having had so much trouble with getting unions in fractured jaws where we do not lose any bone, I felt absolutely hopeless that we would ever get a bone union. We had heard a good deal as to what had been done with different types of metal in restoring broken parts, but a man's jaw is something he is most obstinate about, so far as its use is concerned. In other words, he thinks it is necessary to use it, and the only way is to adopt or devise a method, that he may use it, and that will not interfere with the results. In this case of Dr. Davidson's, the gentleman had an external opening that was draining. He had a sore mouth, and he had a good deal of trouble with the case before Dr. Davidson got hold of it. Dr. Davidson could promise him very little in the way of favorable results. And with all those things staring him in the face, he got busy; and I want to say right here for the benefit of all, do not try to make any appliance out of German silver. Be very liberal and use some good quality of gold. We made some mistakes. Dr. Davidson did not mention all of them. We both had a case pretty nearly like this at the same time, and we tried out German silver to our sorrow. I would suggest that you use gold.

The next question that is going to puzzle you is how to get that jaw dry enough to cement in your appliance. You have to keep it dry, and you have the resistance of the muscles, and to overcome all at one time requires a good deal of energy and ingenuity. Our patient—I say "our patient," because I watched Dr. Davidson handle him—was very much interested in just what results we were getting, and how much use of his jaw he had all the time. No amount of instruction *not* to use it seemed to have any influence on him. Now, after he had gained his space back, and after the wound had closed up, the question of shutting that jaw was the next thing of vital importance. In order to close it, we had to make, or rather we attempted to make, an appliance in which we used the ligature wire. He made a tube to fit on the upper jaw and stuck an excavator into it and twisted it up that way, gained all he could by winding that instrument, like a windlass, and then he made kind of a figure eight tie over the two ends of it, with another ligature wire. In using the ligature wire in this case it was demonstrated that it is desirable to use the smaller wire and use more strands, rather than one large strand, which is rigid, and you cannot draw the slack out of it so well. For after you have put your pressure on it, in a little while the slack seems to come and the jaw has movement. You will find the same thing in winding up any fracture, if you use two strands, or possibly three, of the smaller sized wire, you will have it so soft that you can get slack out of it, and draw your jaws together without any trouble, and the next time you see your patient it will still be tight; whereas when you use the larger sized wires, the result is that you have just enough mobility there to prevent union. This case of Dr. Davidson's was one in which the X-ray pictures show the amount of bone that was lost, and you will have to judge from that how discouraging the outlook was when we started.

I notice that Dr. Abbea, I think it is, has worked out on this subject a method in which he proposes to use a piece of the tibia for splint, and has certain instruments for cutting it; he makes a segment of the jaw, and then he splints those two pieces of bone that he has taken from the tibia across the space on the outer surface there, and in that way he is reporting some wonderful successes. That method is being used, as I understand it, very successfully in the European war. You will find an article on it in perhaps the last issue of the *Literary Digest.*

Dr. R. B. Bogle, Nashville: I believe that in a large majority of cases we get better results by using some appliances by which we give the jaws fixed movement. Sometimes the appliances re-establish occlusion. Dr. King's idea is that re-establishment of occlusion is the one thing that is sought. Dr. Ash has seen cases treated by physicians who did not look to re-establishment of occlusion as the primary object. We all know that where we have injuries, very frequently muscular attraction is very hard to overcome, and in fixing the appliances in, frequently we must do it, as Dr. Lundy says, with some type of ligature wire, that the muscles of the side can be brought into position. I prefer Dr. Angle's band, for the reason that the screw end is hollow, and when you pass a ligature through that, particularly if you want to carry your impression upward, you have a long margin to go through, and that allows you to bring the jaws upward in a very nice position. Again we sometimes find that the tendency of the jaw is to sag right in the line of the fracture, and it is very hard to overcome. That can be overcome by pulling the sagged portion of the jaw to occlusion.

Dr. W. E. Lundy, Memphis: In the treatment of fractures I had one little instance happen that taught me a lesson. I had not cautioned my patient just what to eat, and it happened to be one of those cases in which the jaws were closed, and they fed him sweet milk. One day they gave him some milk that wasn't so good, and in trying to vomit, it nearly choked the little fellow to death. Of course there was nothing to do but clip the wires and open his mouth. If you have a case where you have to close the mouth, do not feed the patient sweet milk; give him buttermilk, or soup.

Dr. C. E. Byington, Chattanooga: I appreciate your calling on me to discuss this paper, but do not know that I can add materially to what has been said.

I am reminded, however, of a case that we have in our office at present; a man with a fractured lower (at medium line) was brought to the office by his physicians, they having had him in charge for ten days or two weeks attempting to correct with bandages to the discomforture and inconvenience of the patient, and without beneficial results. They brought a text book along and called attention to an appliance possibly indicated, which was wholly impractical and not used. I stress this for the reason that the physician, as a rule, does not give the skilled dentists credit for being more competent to handle these cases than one of his own profession. After the appliances are placed, and you have gained apposition, it is also vastly important to see that proper hygienic attention is given. In other words, they should be looked after daily, and with compressed air, antiseptic solutions and normal salt wash, kept in a perfectly sanitary condition.

Dr. S. K. Davidson, Memphis, (Closing): I do not know that I have much more to say regarding this, except perhaps one point, and that is there seemed to be sensations anterior of the resection. After the section had been taken away there seemed to be much sensation forward of that as before. I will say that after the wound of the operation healed, there was considerable adhesion to the bone, and he was advised by the surgeon that he would afterward have to have another operation, severing that union. I advised him to take facial massages and do it himself, and I thought he would be able to sever that union, which he did. It is all right now, showing no adhesion whatever.

Some one made mention in regard to making the splint all in one piece. I would say that I think it almost impossible in a case of as much retraction as there was in this case, to get a splint properly set all in one piece, I don't care how you make it; you couldn't hold the jaw in proper position while the cement set. By making it in two sections, it was made in a line as though the jaw was in proper occlusion, and then put it on and cemented, disregarding the position of one piece to that of the other.

A STUDY OF THE DISPUTED POINTS IN LOCAL ANESTHESIA*

BY S. L. SILVERMAN, D.D.S., ATLANTA, GA.

PROFESSOR OF LOCAL ANESTHESIA AND RADIOLOGY; ASSOCIATE PROFESSOR IN ORAL SURGERY, ATLANTA DENTAL COLLEGE.

IN THE DISCUSSION of this subject it is my aim to avoid predilections for, and prejudices to, any drug or method, permitting the drug or technic to stand on its own merits.

Much that I will say can only be verified or disproved in the clinic, the laboratory offering very little or no opportunity towards a satisfactory solution of certain phases of local anesthesia.

Some time ago Dr. Leo Stern, of New York, published an article[1] in which he maintained that infiltration anesthesia with novocain-suprarenin, resulted in hyperemia and death of pulps. In another and later publication[2] he elaborates on his first observations and reaches the conclusion that, "infiltration anesthesia should *never* be used in the oral cavity."

There are startling case records and necessarily result in a startling conclusion.

It would not be fair to myself if I did not here, at the outset, reiterate[3] that I personally, rarely employ infiltration in my work. And my sole purpose is to learn whether or not it can be employed with safety.

In order to freshen your memory with the controversy that has arisen between Dr. Stern and myself, permit me to briefly quote the substance thereof:

I criticised[3] his advocating the pumping motion, "moving the syringe backward and forward," when performing the maxillary tuberosity and mandibular injections, because this method tunnelled through the tissue unnecessarily and because[3] it would, by repeated jabs, do the things that those who practiced this method wished to avoid. To this, in answer to my criticism[4] he replies that Braun advocates this practice and then quotes Braun as follows:

"To avoid injecting large quantities of the anesthetic into a vein (and thus avoiding toxic effects) the syringe must be in constant motion, injecting during the insertion and withdrawal of the needle."

As is obvious from this quotation, Braun does not advocate pumping and his fear of injecting directly into a vein is unwarranted, as applies to the dental regions; and moreover, such accident is harmless, providing the solution is injected slowly. As a matter of information, I must add that it was Riethmuller who, in October, 1914, first called my attention to the adoption of the pumping motion, but has since concurred in my denunciation of the practice.

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*Read before the joint meeting of the Interstate Association of Anesthetists and the National Dental Association at Louisville, Ky., July, 1916.

Let us now examine the most interesting part of the contention, that is, whether or not to employ infiltration.

That thousands of operators throughout the world employ infiltration anesthesia without the above-mentioned sequelæ, is a fact too obvious to mention. And I haven't either in print or correspondence been able to find other instances than those Dr. Stern mentions. Desiring, therefore, to test this point of contention in as near a laboratory manner as possible, I hit upon a plan that I think is certain to either commend or condemn it, but of this we shall speak later.

Dr. Stern is of the opinion that the "vaso-constrictor action of suprarenin," plus the "mechanical damage, subsequent to the great pressure required to force the solution into deep structure," are to blame for death of pulps; to which I must say that by diffusion and not by pressure, does the solution pass through the bone, and as Dzierzawsky has shown, using colored solutions in subperiosteal injections, it does not require long for the bone to be permeated, and, however delicate tissue may be, it still has recuperative powers and the action of suprarenin as will be shown later, appears to have no detrimental effect.

But these again are merely processes of laboratory reasoning. Permit me then to acquaint you with the experiments started:

Realizing that the average clinic is not a suitable place for the results sought, because after infiltration it is rather uncertain as to whether the patient will return at stated intervals for the purpose of ascertaining the vitality of pulps, I asked the first-year students of our college to volunteer for infiltration injections just for the experiment. I chose the first-year students for an obvious reason, namely, I have access to them for at least three years for observation.

The injections were all made in the presence of class members (whom on this occasion I wish to sincerely thank) and the technic employed was as follows:

The vitality of the right upper lateral was ascertained, and when found devitalized, the left upper lateral was chosen, and in no case did we have to leave these regions. The gum was iodinized, and 1½ cc. of a 2% novocain-suprarenin solution was injected, and the area massaged. In no case has there been a report of trouble and upon opening of college, I shall at intervals re-examine our cases for this report. These experiments are necessarily slow, but we must build on facts.

A very important and probable factor where death of pulps has occurred following infiltration anesthesia, is the injury caused by over-heating with stone or bur. Though the tooth under anesthesia be insensitive to grinding, it should not be subjected to prolonged friction. A stream of water should be directed into the cavity during excavation.

Nor can the fact be entirely overlooked that some teeth we are called upon to treat are, as far as the pulps are concerned, already in a semi-devitalized state, and would without any sort of an injection, die.

We now come to a very interesting phase of my subject. What is the cause of partial collapse under novocain, the pallor, the trembling, etc.? Various authors contribute to the causes, but I have never seen any one book or article that lists all of the causes that induce these results.

Thus Dr. Kurt Thoma is certainly in error when he imputes the tremor, pallor, etc., to suprarenin. And the "T" tablet which he advocates will produce tremors similar to the "E" because it is the novocain, and not the suprarenin that is to blame. The solution that we usually employ, is made by dissolving 1 "E" tablet in 1 cc. of Ringer, the result being a 2% novocain solution, and the suprarenin in 1 to 20,000 solution. Dr. Thoma would have suprarenin in 1 to 70,000 and therefore be of no practical value. When we realize that physicians daily use a 1 to 1,000 solution (15 drops of same) with impunity, excepting in the aged, it stands as a safe procedure. *Moreover, the most practical test shows that pure novocain or cocain when applied to an open wound, causes this tremor to appear, yet when suprarenin 1 to 1,000 is applied, this effect is not to be noticed.*

I have injected pure novocain into my forearm subcutaneously with the typical novocain tremor, which, by the way is preventable, but on injecting 2 cc. of suprarenin solution containing the same amount of the drug that is contained in 2 E tablets (viz.: .00010 of a gm.) this effect could not be produced. The reason for this is obvious: when novocain or any other local anesthetic is injected into the system, part of it immediately enters the circulation and as it passes the cardiac and respiratory brain centers, it affects them just sufficiently to create this flutter, this disturbance.

And now, can this novocain tremor be prevented? Or are we to allow a fear to spread throughout the profession and curtail its use? Already there is spreading a belief that there exists a novocain idiosyncrasy. And there is as much truth to that as there is to the superstition that there exists an idiosyncrasy to cocain. I hope that no one in this intelligent body is of that opinion, either as concerns novocain or cocain. Certainly no one here believes that when sloughing resulted after some careless pioneer injected a cocain solution that had stood so long on a dusty shelf, and had become so mouldy that it seethed with infection. I repeat, no one would credit the drug in this event, nor is it necessary to spend very much time ascertaining the truth of this statement, when you realize that in all the literature you never have heard of a clean cocain preparation ever having affected the most sensitive of tissue, viz.: the eye, the urethra. And while on the subject, let me say that were it not for the fact that cocain is habit-forming, and cannot be sterilized by boiling, it would make an excellent substitute for novocain, in spite of its toxicity. But here you must be able to differentiate between toxicity as that term refers to the central nervous system, and local destruction of tissue (sloughing). The latter, cocain is incapable of doing, and its toxic effect on the central nervous system can also be prevented by proper care.

I suppose it is needless to state before this audience that in order to obviate tremors, partial faints, pallor and so forth, we must inject very, very slowly, and must have the patient in as near a supine position as is convenient.

The term "slow" is a relative one. Some operators empty a 2 cc. syringe in five seconds and think that it is a slow injection. Others double this time and think that it is an exceedingly slow injection. But if you would remember one thing of what I have said, please bear this in mind: *Take sixty seconds by the clock to empty your syringe, and you will have no experiences to relate.* Dosage matters but little; I have often used more than a tube of "E" tablets in surgical operations on the jaws. Concentration is of more moment than dosage, and even concentration is of less importance than the slowness of injection.

In this connection I wish to call your attention to the dangerous maxim promulgated by Seidel at the Muenster Congress where he remarks that "It makes no difference whether a certain dose is injected in weak or strong concentration, as long as the total dose of .2 gm. is not transgressed."[5] This certainly is dangerous teaching, and even the novice is aware that no local anesthetic is so harmless as to be used irrespective of concentration. A 5 grain tablet of bichlorid of mercury is certainly less toxic in a gallon of water than it would be in an ounce of the same. And so with .2 gm. of novocain.

Position has a great deal to do with prevention of the above-mentioned results, and the more erect the patient is sitting, the slower should the injection be executed.

When a patient is in a fainting condition, our first step is to place him in a supine position, so why not approach as near this position as is convenient and obviate chance? You often have heard the expression, "he or she *fell* fainting," but I do not remember hearing of a faint from any cause while lying down. Attention to these details is productive of uneventful injections, and the so-called idiosyncracies are not to be observed.

(1) Local Anesthesia in Dentistry, Sept. 1915, Items of Interest.
(2) Jan. 1916, Dental Cosmos.
(3) See my letter in Dec., 1915 Items of Interest.
(4) Feb., 1916, Dental Items of Interest.
(5) Quoted from Thoma's Oral Anesthesia.

Iodin as an Antidote for Carbolic Acid Poisoning

Dilute tincture of iodin, which is applied on the skin after irritation by carbolic acid, can also be applied as an antidote in cases of carbolic acid poisoning. Tincture of iodin exercises a favorable influence on the mouth and esophagus, and acts favorably even when toxic symptoms have already manifested themselves in the stomach and intestines. It probably forms a non-toxic iodized carbolic acid. Tincture of iodin may be considered superior to alkaline sulphates in these cases.—*J. Maberly, Union Pharmaceutique.*

HOW WE GET OUR PATIENTS AND WHY*

BY H. H. NAFF, D.D.S., KNOXVILLE, TENN.

THIS LITTLE paper on, "How we Get our Patients and Why," is not read for the purpose of imparting knowledge, but more to impress what we already do or should know, and also for the able discussions I am sure will follow from those who have been in practice long enough to have had wide and varied experience along this most important line.

Our profession has developed so rapidly in the past few years that it has become a necessity for us to develop the business side, or what you might term selling service, as well as the professional side.

The very first patient that comes to us after we have started in the profession is the time to start selling service, good, honest, conscientious service. First, satisfy ourselves as to the operation, then satisfy ourselves that we have performed the operation to the best of our ability, and I firmly believe that nine of every ten of our patients will themselves be satisfied, for I have found the hardest one to satisfy is the operator himself. A sale is the result of a conviction of both the operator and the patient that what the other has is more desirable than what he already has. The patient is convinced that certain dental services will be of more benefit to him than the money he is to pay for them, and likewise the dentist is convinced that the patient's money is more desirable to him than the hoarding of his skill and equipment.

Impress upon the patient the important need, you might say necessity, of your service. A patient is often convinced of the necessity of your services by nature itself, in discomfort of many kinds. This conviction is made stronger by a little talk from the dentist when he explains "why" to the patient, and he is made to see and understand things he probably never thought of before.

First I will take up office equipment. Most of us can tell about what one of our profession is doing, what class of patients he is serving, etc., by simply going into his office and taking a look at his reception and operating rooms.

After equipment, one might say before equipment, comes a dentist's personal appearance. You may find a few instances in which men of careless habits have made a great success in practice, but I believe the day is past when a dentist can afford to neglect the details of his personal appearance, if he wishes that class of patronage which is most profitable financially. Personal carelessness may render futile all the efforts the dentist may make. A fine reception room, a completely-equipped operating room, and the best of skill are set at naught by a dentist whose personal appearance suggests carelessness and uncleanliness. If patients could be sure that uncleanliness was confined to the garments alone, it might not be serious; but the visible uncleanliness is a token of habitual carelessness, and suggests unclean instruments, unclean hands, infection, and many patients can almost imagine disease itself.

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*Read before the Tennessee State Dental Society, 1916.

Exchange places with your patient, and for a moment take the chair yourself. The operator approaches you with unwashed hands, although he has just dismissed a patient, a mouth mirror with plaster, or cement, (and I have heard of them being used with blood on them) is thrust into your mouth. A dirty explorer is used. Now how do you feel? Some of your patients might not see these things, yet a majority of them are very much more watchful than you yourself.

Don't be clean because you are afraid your patient might find you out; don't be clean because you are afraid not to be, but be clean because it is the right and proper thing to do. This is one place where each and every one of us should use the Golden Rule.

Next, an unkempt dentist does not inspire confidence that he can be trusted with one's dental services, because he does not appear to have succeeded in his own undertakings. He is a picture of failure in all the things he should have done for himself. It may profit any dentist who is not securing the patronage he wishes, to examine himself mercilessly in respect to appearance. Let him be his own severest critic. Correction of carelessness in this detail has been known to revolutionize a practice in a surprisingly short time. Married dentists who are absent-minded in this particular should heed their wives' admonitions.

More important than the general toilet is the appearance of a dentist's hands, because they come in direct contact with the patient, are easily soiled, roughened and marked by stains and dirt, but can be kept in good condition with a little care. Never approach a patient without first cleansing your hands thoroughly in a lavatory, which every dentist should have in plain view.

Next comes the dentist's manner. Adopt the pleasant, courteous manner common to gentlemen; don't be flippant, don't be familiar with your patients, even if they act in such a manner toward you. It does not increase one's dignity to hold aloof from others or assume a superior air, nor does it lower the dignity to assume the friendly attitude of an intelligent worker, who has specialized in one line. No one knows enough to justify pride. One of the leading diagnosticians of this country frequently says to patients, "We know so very little of what we need to know that it does not pay us to be certain." In other words, don't talk too much and be sure you know before you talk at all.

Next, you must be a salesman. Watch your patient's expression when explaining certain things that must be done, lead him to the threshold of discovery and let him make it himself. The action which the patient thinks he took of his own initiative is likely to remain more satisfactory than the action into which he thinks he was forced.

The patient will usually ask the fee. Its acceptance will depend largely upon the clearness of his mental picture of need and benefits, which you as the salesman have made. It goes without saying that no dentist should demean himself or his profession by false or exaggerated statements; usually the need is such that there is no excuse for exaggeration.

When all conditions are favorable to a sale of dental service at a satisfactory fee, the entire transaction will turn upon the patient's convictions that the benefits from the service justify the expenditure. That conviction will doubtless be founded partly upon the understanding of the character of the work, but much more upon a feeling that the dentist understands the case, and that he is capable of rendering satisfactory service.

A dentist's personality may draw some patients, his friends may use their influence to some extent, but the one and only thing that will insure success is satisfied patients, who feel that they have been given good and conscientious service, and thus an endless chain is started, the dentist being the first link, and his patients the links that follow.

In closing, my paper can be summed up in a few brief words.

How we get our patients: From satisfactory service. Why we get our patients: Because we have rendered that service to someone whom they know directly or indirectly, and in whom they have confidence.

DISCUSSION

Dr. R. D. Crutcher, Lewisburg: Dr. Naff's paper shows considerable thought, and should appeal to every dentist in America. We are interested as a profession along this line, and we are looking for great things from the profession toward advancement which will develop all who are interested. Cleanliness is next to Godliness; and that being true, it devolves upon us to see that our offices are kept as neat as a pin, our instruments sterilized after each operation, our linen also sterile, and the office should be kept so as to make it inviting and our patients will be favorably impressed. When patients come into our office they are favorably or unfavorably impressed by the surroundings, just as we are when we step into a brother's office. I want to thank the doctor for this splendid paper.

Dr. B. H. Johnson, Nashville: This is a subject that I have been interested in. I made an attempt to write a paper along this line in 1907, when the association met at this place before, and I think it is a subject that we all ought to study more and give more attention to, for it means a whole lot to the dentist as well as to his practice The essayist has brought out almost all of the essential points, but I want to emphasize the fact that the condition of the dentist's office appeals to people in many ways that we do not realize. And so our personal conduct, not only in the office, but outside of the office, has a great deal to do with the building up and holding of a practice. He says we have to be salesmen. One of the greatest things that a salesman can attain is the faculty or ability to read human nature, and tell just exactly how to treat each person with whom he has any dealings. A salesman can go to one merchant and sell him goods and perhaps by the same tactics make another man angry. We have to deal with our patients in the same way in selling our time and service to them.

I think that one of the greatest things we all ought to study is the reading of human nature. Some people seem to inherit that ability, and some of us have to acquire it, but I think it is one of the things we need. I certainly enjoyed the essayist's paper and it shows that he put some time and study on it, and also shows that he is thoroughly interested in this phase of the work.

Dr. Herbert G. Cunningham, Bristol: I have noticed, and no doubt others have, that when a lady comes into the office she generally takes in the surroundings. If you get a lady favorably impressed she will do a lot of talking for you. On the other hand, she can do as much against you. If anything in the world appeals to a lady it is cleanliness. As is said "Cleanliness is next to Godliness," and if we carry it out in our work and office, we are sure to succeed. I heartily agree with the essayist in what he states in this paper.

Dr. W. H. Richards, Knoxville: This is an interesting paper, and is one for the benefit of the young men. It is too late for the old men to change, because a man becomes fixed in his habits and ideas, and it is hard to dislodge them. It is hard to teach an old dog new tricks. It depends on the dog, though, as to whether he can be taught new tricks. I have raised several dogs in my life and have found that the dog whose attention I could not get, to look me in the eye, isn't likely to learn. But you watch dogs, and you will find some of them will look you right squarely in the eye, turn their heads this way a little bit, or that, seemingly to get a better view. Now, that kind of a dog will learn. But if you get one of those dogs that is just looking out for himself, nothing pleases him particularly except the bone with the meat on it, you will not make much progress with him.

Now getting back to the young man and the financial side of the question. There are many young men who start out in practice with ideas—well, I cannot say what their ideas are—but it is important that they have ideas, and those ideas should be high. Financial conditions sometimes lead a man to sacrifice his ideals for the sake of money.

I have been practicing for a long time, and I have noticed that a man will start out doing first-class work, as good as he is capable of doing. After a while his practice begins to increase more and more, and instead of maintaining his standard, what does he do? Why, he sacrifices his standard, which he should never do, for the sake of the almighty dollar. His standard then begins to go down, while his dollars come in, and for a few years he will fool some people; but what will be the ultimate result? After a while he will be sinking on down, down and down, thinking that possibly by lowering his fee he will increase his business, and taking advantage possibly of the reputation that he has made when he began his work and stuck to it for a few years, that is, stuck to his standard. It is a deplorable thing when a man gets into that stage. When a young man starts that way, the likelihood is that he will be ridden to death by his patients.

I do not think there is a greater missionary work that has been done in the United States, than has been done by the *Dental Digest* on education along the line of selling your service, and this is the point exactly. Instead of doing any more business by lowering your fee and trying to corner everything, raise the fee in proportion as your services are demanded. Some one said to me some time ago, "Why, doctor, why don't you work for less per hour or per day?" Why, just because I can get more. I have worked for nothing, just my board; not in the dental profession, but in getting started. Then when I got into the dental profession, and I had an abundance of time, I put in that time in making those fillings good. Some of the best fillings I ever put in in my life, were done in the early part of my practice, when I had an abundance of time, and in that abundance of time, I gave ten times more service to the individual because of that abundance, than I would by a slip-shod sort of a way, and taking chances.

I have fillings in my front teeth here that were put in in 1868. They are there today, and you cannot find a fault with those fillings. They were done by a diligent young man starting in practice in a little town in Virginia. He has gone to his last reward many years ago, but there is that work standing there today. The lesson I got from that man was his diligence and the care with which he went over everything, and that is a monument to his memory, and as time goes on those fillings will speak for him, as they are speaking for him today

Dr. P. N. Ogle, Knoxville: Dr. Naff's paper is fine. I will not attempt to discuss the paper at all, but there is one point I want to speak of, and that is with regard to the impression we leave with our patients. We cannot lay down any concrete rule to go by. When a stranger comes to us, one who may never have heard of us, he comes in and gets his first impression and that impression is going to be a lasting one, and you must make it a good one. And you treat one fellow one way and perhaps you have won his friendship, whereas you treat another fellow the same way, and perhaps you have made him an enemy. And so you have to read human nature, and treat every man in such a way as in your judgment will gain his confidence.

Dr. E. G. E. Anderson, Knoxville: There is an old saying, "Laugh and the world laughs with you; weep and you weep alone." I find that patients come to the office, and if you a friend have that is weeping for you, they will have the same feeling for you. If you can inspire confidence and gain their friendship, you get them and hold them. I am not attempting to discuss Dr. Naff's paper, because I agree with everything he said. I just wanted to voice my appreciation of the paper.

Dr. Naff (Closing): In closing my paper I wish to thank Drs. Johnson and Ogle for bringing out one matter which I failed to go thoroughly into, and that is the reading of human nature. Dr. Richards also brought out some excellent thoughts. He has been in the profession for many years, and knows just how a young man should start to succeed. I myself among many should always be willing to listen and heed his advice. He has always been a friend to any member of our profession, and has given all of us good as well as useful points. I thank you for your kind attention.

Drug Treatment

In a pamphlet recently issued by a prominent drug house, I find under the etiology of pyorrhea alveolaris, this statement: "That pyorrhea is the cause and not the result of malnutrition is now an accepted fact." This use of the word "pyorrhea" conveys the idea that pyorrhea alveolaris is not the result but the cause of malnutrition, and I think that that was the intention of the writer. When referring to those pathological conditions of the tissues included in the alveolo-dental joint, the practice is all too common to speak of them as "pyorrhea." This is no better title for the affliction than gangrene would be for an ordinary healthy wound. I don't believe that pus will appear in appreciable quantity, unless the individual is very much run down or the mouth and gums are very much neglected. But when a remedy is discovered a disease must be found to fit it.

This reminds me of an old story I heard when a boy. It is so old that perhaps it is ready to appear again as a new one.

There lived in our town an "Herb Doctor." They called them "Yarb doctors." His specialty was curing "Fits." In the hallway of his home and office, on a shelf facing the entrance, was a two-gallon bottle. At the bottom of this were several layers of different shades, presumably herbs, and on top of them a dark liquid. A large label on the front of the bottle read "For Fits." The story was told that on a certain day a gentleman who was suffering from an attack of jaundice, which was known to the old-fashioned folks as "Jaunders," went to consult with our doctor. After he had described his feelings and asked for a remedy, the doctor said: "Tell you the honest truth friend, I don't know much about "Jaunders," but tell you what I'll do; I'll give you something to give you "Fits" and I can cure them all right.

—J. S. Engs, *Pacific Dental Gazette.*

ASEPSIS OF THE DENTAL OFFICE*

BY C. WALSH HOFFER, NASHVILLE, TENN.

UNDER THIS head we mean the possibilities of patients carrying contagious diseases to the dental office, and other patients becoming infected from these germs of disease left in the unkempt dental operating room—and also from actual contact from instrumentation with instruments not properly cared for.

Seldom we are unfortunate enough to practice for that patient suffering from contagious disease, but often we have patients in our practice some member of whose family is suffering from such diseases as measles, diphtheria, whooping-cough, scarlet fever, chicken-pox or small-pox, said to be transmitted or carried by the clothing. Then there are such diseases as tuberculosis, pneumonia, influenza and some pus-infections that may be transmitted, due to unkempt offices.

We may rid our office of considerable disease by having sunshine and fresh air accessible at all times to the operating room. This should be direct sunlight.

Our water supply should be carefully looked into; there are times of the year when the water is laden with germs. If this be the case, it is not fit for the patients to rinse the mouth, neither is it to wash hands and instruments in that go direct to the patient's mouth.

We should pay close attention to the plumbing, in order to prevent any escaping of sewer gas or other noxious gases in the operating room. Great care must be taken to prevent dust settling, and allowed to remain on cabinet shelves, draperies, brackets—the furniture and fixtures should be finished hard and plain, better white, in order to allow easy removal of dirt or accumulations with damp cloth.

Plush is very objectionable on a dental chair, as it is something that cannot be perfectly cleaned. If a rug or cork is used to stand upon, it should be frequently cleaned. Carpet on an operating-room floor is very unsanitary.

Air in the operating room is of great importance, especially to the operator, who constantly breathes it—the heating of so many offices comes from dirty, damp basements or from sewer ventilation.

Keeping the operating room aseptic is no small undertaking—it is next to impossible, yet it may be kept clean enough not to be means of spreading contagious diseases.

Dust is the enemy of cleanliness. The walls, wood-work, pictures, in fact everything pertaining to the operating room should be thoroughly cleaned once a week with soap and water; after this the room should be fumigated with formaldehyde gas, or some disinfectant agent. Formaldehyde 5%, phenol, or bichlorid should be used to wipe such things as chair arms, drawer handles, bracket table rings, and those things hands come in contact with during operations.

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*Read before the Tennessee State Dental Society, June, 1916.

There should be no waste cotton rolls or rubber dam, allowed on the floor after being in contact with saliva in the patient's mouth. Care should be taken not to draw pliers over the opening of waste jar in removing a cotton dressing from the mouth. Soiled napkins, towels and rubber dam should immediately be removed from the operating room after operations.

The cabinet is a great receptacle for the accumulation of germs. There should be no fabric-lined drawers; should be of a material presenting a smooth, hard finish, and each drawer should be wiped and scrubbed at least once a week. The instruments should be covered with some material that can be easily sterilized or destroyed. There should be no instruments allowed in the cabinet until cleansed and sterilized.

What is known as hygienic trays, made of glass or granite, are very suitable for operating trays and are easily cleaned. The table known as the bracket-table, is often of such material that cannot be thoroughly cleaned. It should be plain glass or porcelain, without decoration on the frame. It can be covered with aseptic mats which can be readily removed after each operation.

The operator should be dressed suitably for work he has to perform· His coat or gown should be of washable material; close fitting around the neck and sleeves; no buttons or flaps to catch patient's hair or clothing—long hair and whiskers are not aseptic to operations. Care should be taken not to allow expired air from the operator to be directed towards patient's face.

The hands of the operator should be of great pride to him. They should be well taken care of—smooth and soft; nails should not be cleansed or scraped with sharp instruments—they cause places for germs to lodge; hard brushing is injurious to the hands. The nails should be cleaned with an orange-wood stick, as this will prevent scratches, or places for lodgment of bacteria. The hands after being thoroughly washed, should be rinsed in sterile water or alcohol. It isn't a bad idea to wash them frequently during particular operations, such as root-canal work, or gum treatment, and rinse in formaldehyde, as it is known that the hands will not stay sterile for any great length of time. If the operation must be absolutely sterile, then it is necessary for the operator to use rubber gloves.

Solutions to sterilize the hands, such as one-in-forty phenol, three to five minutes, or three per cent. solution of permanganate of potash, or one-in-a-thousand bichlorid of mercury solution—following this with alcohol bath. There is no doubt that the dentist's precaution should be to prevent transmission of infection, from one patient to another.

The operator should avoid touching his clothing, face or hair, or any furniture while treating roots of teeth, or doing operations which may bring his instruments in contact with the abraded surfaces. Before winding cotton on broaches for root treatment, fingers should be immersed in bichlorid or formaldehyde solution. The field of operation should be as carefully prepared for the operation as the hands or instruments.

Food particles from the last meal or two, and in some cases a dozen meals back, may be found about the teeth. It is well to spray, and have patient rinse the mouth thoroughly with some good antiseptic, before undertaking a thorough examination. A blast of air or a spray of one of the essential oils will clean the field for examination. Large cavities containing decomposed food should be opened and washed out with an abundance of warm water, containing some antiseptic. If the cavity is to be filled at once, or the pulp involved, teeth in its vicinity should be dried and wiped with alcohol—and if the rubber dam be in position, all teeth that are exposed should be thoroughly cleansed with a strong disinfectant. A root canal should never be opened without thoroughly cleansing the teeth about it and the cavity itself.

Care of the instruments is perhaps more important than care of the hands and the field of operation, because they more often come in contact with the secretions—this is especially true of lances, clamps, separators, forceps, scalers, broaches, explorers, trimmers, hypo-needles and matrices.

Instruments should be selected with the view of their easy sterilization—cone socket, wooden handle instruments are not so easily sterilized as all steel that are fairly smooth. The hand-piece to the dental engine is very hard to sterilize without rust or corrosion. There is a thin metal sheath on the market designed to slip over the hand-piece, which greatly simplifies this one instrument, as it can be removed and boiled; there are two methods of sterilization, boiling and drugs. As a rule the more certain is boiling, but even boiling for ten or fifteen minutes will not destroy spores of some organisms.

The most satisfactory sterilizer of this type, is one with a tray that will allow the water to be drained off and the heat from instruments permitted to dry same. Sterilization by drugs is not always satisfactory; efficient drugs have to be used in such strength, that unless the instruments are wiped dry before using, there is a possibility of injuring patient's soft tissue.

The odor and time required for some drugs to act are serious objections. A three to five per cent. solution of formaldehyde will sterilize in a shorter time than any other drug or combination of drugs that are suitable for the purpose. If borax be added, it will not rust or corrode instruments. No great dependence should be put in proprietary disinfectants for either mouth or instruments.

All instruments used in operations should be removed from bracket table and washed in water and sterilized, then placed in their respective places. Burs, files and such instruments should be cleaned with a brush before sterilizing. The revolving brush wheel is objectionable on engine unless sterilized after each operation.

After broaches are sterilized, they should be kept in a closed place or corked bottle that is frequently sterilized with formaldehyde vapor. The hypo-syringe should have the very best care—should be sterilized after each operation and kept in a closed sealed jar, containing 70% alcohol and glycerine, and thoroughly washed in boiling water before using again. The nozzle of the spray bottle should be sterilized, and water syringes kept in formaldehyde solution when not in use. The filling materials used should be kept in a place free from dust and contaminating gases—the gutta-percha points should be kept sterile and sealed, as they are often inserted in the canals from non-sterile places of keeping.

Every office should be equipped with sealed glass jars containing plain and boracic gauze of different widths, and cotton wipes may be kept sterile in the same jars—the jar and its contents may be sterilized in one oven of boiling water. And adrenalin tape that comes in sealed glass jars is also necessary for hemorrhages.

With this equipment the dentist is always prepared to manage any operation that he may be called upon to perform.

DISCUSSION

Dr. D. M. Cattell, Memphis: The times are propitious. The satellite has become meteoric. The star is becoming standard. I want you gentlemen to know that the writer of that paper means what he says. If you will visit his office you will find that every word that he has uttered is carried out there. In the course of my wanderings around the country, I visit many offices. I have never seen a cleaner office than Dr. Hoffer's. Every idea that he has put forward in the paper seems to have come from his office experience and office practice. We cannot say of every writer that he carries out the ideas which he promulgates in his paper. This is the day of cleanliness beyond anything that our profession, or any profession, or the world, has ever known. In all lines of experience and thought we are looking toward cleanliness. We give it a higher-sounding name now. We call it hygiene. Six or seven or eight years ago, when the association met here last, the mosquitoes bit us so that we were in torment. We aren't bothered with them now—an evidence of cleanliness.

I want to compliment the young man on the paper that has been read from this standpoint. It is his maiden effort. Yet he has touched upon one of the most serious subjects of the profession—asepsis. Away back yonder it was antiseptic surgery. I remember some of the ways they worked in those days. When a surgeon began his operation, we guess he washed his hands, we don't know—we didn't see him. He may have washed off the field of operation with a little soap and water. We don't know—we didn't see him. But we did see his assistant stand up there holding a bottle in one hand and a rubber bulb in the other, and as the operator began his work he would spray some strong antiseptic solution over the operator's hands and the part to be operated upon. Now that solution was universally, in the earlier days, a preparation of carbolic acid, phenol, as we call it now, and finally the operator's fingers would become so benumbed that he could not even feel the instrument in his fingers. He knew what he wanted to do. Volition told the hand what to do, but he could not hold the instrument, and so I have seen him turn to his assistant and have a little string wrapped around the fingers, holding the instrument so as to keep it tight there until he finished the operation. That was *antiseptic* surgery. Today it is *aseptic* or cleanliness. I fear that we do not all understand the real meaning of that word. Let me tell you a thing that actually happened when this asepsis was new. A clinic was performed by a surgeon, and a great one, in the Illinois State Dental Association. It happened down in a little town, and the operation was performed, as it was called, aseptically. The doctor made much about having those instruments clean. He didn't have any boiling water, but he had a preparation of carbolic acid. He dipped every instrument into that and then wiped it off on a cloth. That was the idea of surgical cleanliness in that day. The operation was performed under the very best conditions possible in those days, outside of a hospital. It was performed in the forenoon. The patient remained about there all day, and after lunch when we returned to the hall, a gentleman from a neighboring town came in, a friend of the surgeon, and he went to the operator and asked him all about it. So of course out of courtesy, took the patient and sat him in the chair, and that is when I got my eyes on it again, and he was telling him all about the operation—there had been considerable cutting of the tissues, sewing up again, and so on, and in explaining to him, the doctor pulled out a pencil that had a rubber on the end of it, one carried in his pockets probably for weeks or months—I don't know—pulled it out of his pocket and stuck it down in the hole, in his explanation. The next day the patient developed a fever, and directly the pus was flowing. Asepsis! And I am afraid that that is the way that a great many of us do when we say we are working asepsis. (Au-sepsis.)

I remember a few years ago I asked a gentleman who had the chair of materia medica and therapeutics to give me a mouth wash. I wanted a jug of it, so that when it was necessary to use a mouth wash stronger than plain water, we could have it so that we could simply turn the faucet on and get it *ad libitum*. He made up three pint bottles of it. Two of them we used up, and by the time we got to the third one, holding it up to the light, it looked as though there was some growth in there. I took it to the professor having the chair of pathology and bacteriology, and I put it up to him and asked him to tell me about it, whether it was aseptic or not It looked like a growth of micro-organism there, and in fact it was.

Now gentlemen, on behalf of the writer of this paper, I want to plead with you to do something about asepsis. I mean that when you go into your office, clean things up as he suggests, and keep them clean. You can go around to the offices here in the country many places and find carpets that have been on the floor for seven years. Why, they don't even do it so in a hotel any more. They have a rug that can be taken up and shaken once or twice a year at least. And you have pieces of cloth lying around there, thrown over tables and so on, that have been there for months unwashed, and yet you go out to talk to a patient in the reception room, and in some way you put your hands on that dirty thing and you go right back to the chair again and begin operating on some tissue that is just ready to receive an infection, and you place it there, and you tell your patient that you are "a great believer in asepsis and cleanliness." It isn't fair to the patient. When I go around through the offices in the country I find many of their instruments that will have little pieces of decayed tooth structure sticking to them, not washed off, and blood sticking on there, and of all the things that will gather micro-organic life and propagate its kind, it is blood. We are not careful enough about this. It was ten years after I saw that operation by Dr. ——— before I dared to tell about it. And he came to me about it; he heard of it, and he said at first when he heard it, it made him sick all over—that d—n Cattell going around and telling such stuff as that. "But," he said, "I remember that I did do just that thing, and when I cooled off I found that Cattell was right, and he had a right to expose it," and he slapped me on the back and he said, "Whenever you catch me or anybody else doing such a thing as that, tell about it."

Now, if each one of us will just remember some little fault that we have done like that—we may have done more damage than was done to that man or maybe less—let us take a new hitch on this thing and do something about it. The world is growing better; the world is getting cleaner; and if we propose to stand with the world and keep in the van, we have to do things ourselves. We have to be one of the leaders in the cause. Hot water, boiling water, is cheap. It is easily gotten. You may put something else with it to make it more effective; that is, I mean do its work quicker, but boiling water will do it. There is not a micro-organic life in existence that I know of but what boiling water will kill it sooner or later. And we can all have boiling water. If nothing else we can go down to the store and get a coffee pot and have a little oil stove, and fill the coffee pot with water and put it on the oil stove and touch a match to the wick, and we have got it. And that may save a life or two lives, or perhaps more, simply by that coffee pot kept full of boiling water. Now that was not well expressed but you fellows know what I mean.

Dr. B. H. Johnson: I want to emphasize what Dr. Cattell says about Dr. Hoffer living up to what he preaches. I had occasion some time ago to send a young lady from my office to Dr. Hoffer's office, and when she came back I found that she had learned something, for immediately she went to looking around, and I didn't know what had happened to her, didn't know why she had gotten so active. She said, "I believe that Dr. Hoffer is cleaning all the while; everything is nice and clean." I think if I have occasion to get a new girl into the office I will send her down to his office for a little while and get some inspiration for keeping things clean. Now if she noticed that the minute she was in there, how much more would people notice it who paid attention to it, and those things are generally noticed by many of the patients that come to your office. I think things along this line help out a whole lot, and we ought to pay more attention to it. No matter how clean we are, we cannot be too clean and too careful. Dr. Cattell mentioned about putting your hand on a table or something of that kind and then going on with an operation. I think it is a good idea to have a lavatory where the patient can see it, because the effect on the patient's mind will have much to do with those things. After each time we take hold of a telephone or shake hands with any one, or take up something that is not sterilized, we ought to turn to our lavatory and wash our hands again before turning to the patient. A patient will notice those things, and if they know you real well they will mention it to you, and if not to you, they will mention it to some one outside of your office. And over and above the satisfaction of your own mind that you are taking every opportunity to prevent transferring some disease to some patient, it is an advertisement for you and tends to help in a great many ways.

Dr. C. W. Hoffer (Closing): I want the society to know that I deeply appreciate what these gentlemen have said in speaking so kindly of my office.

The use of modeling composition is something which I think is certainly abused. Modeling composition, to my mind, should be discarded after it is used, and should never be used over. I think the manufacturers should fix it in some way so that it would not be fit for use a second time; fix it so that it would be so hard that they could not put it together, and put it back in a patient's mouth. I expect that there is modeling composition in some of our offices that has been used maybe for every patient that has come into the office for an impression for a year or more, and if it is boiled you know it deteriorates the compound so that it is not fit for use again. You cannot get the same correct impression with modeling composition after it has been boiled and I do not know of any way to thoroughly sterilize modeling composition.

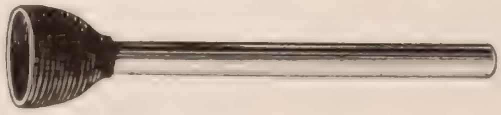
Q. How about wax, Doctor?

Dr. Hoffer: Wax is worse than modeling composition. Wax is not used nearly so much as modeling composition. It is used principally for bites, and I do not know that it is so hard to get wax back to form to use again, and the dentist that is lazy enough not to take care of his wax, and take a new sheet out of his box every time he wants to take a bite, is deserving of severe criticism. I do not believe there was anything brought out except Dr. Cattell seems to put a great deal of stress on cleanliness in the dental office and carelessness, and all of you who heard his talk last night know what he thinks of carelessness and what it has caused. I appreciated Dr. Johnson's talk and discussion, and I certainly appreciate what Dr. Richards has said.

TO RE-CEMENT A LOOSE BRIDGE WITHOUT REMOVING

BY L. E. CUSTER, D.D.S., DAYTON, OHIO

Frequently the gold cap end of a large bridge comes loose while the other part is still firm. Drill a hole in the crown with a No. 7 bur, wash out and dry out. Having selected a rubber cup, such as is used for polishing teeth, the mandrel serving as a handle, fill the cup with slow-setting cement, and pulling the loose end off, as far as possible, press the cup over the hole in the crown and slide the cup off sideways. Refill with cement and repeat until cement appears at the cervix. With the ball of the finger over the hole, press the bridge back to place. Fill the hole in the crown.



PREPAREDNESS*

BY B. D. BRABSON, D.D.S., KNOXVILLE, TENN.

IN THIS TITLE some may apprehend the sound of shot and shell' but you need fear no evil, as its purport is peaceful.

Some one has said, "There is a shameful contentment in most men with lives of fractional efficiency". As to the truth of this statement we may vary in our opinion, but this fact remains: many men exhibit lives of mediocre ability. Some times we find what we are pleased to call a genius, and scarcely any effort is required by one so richly endowed to do things that others must dig up with unremittent toil. And whether one attain the purpose sought in comparative ease or in the sweat of his brow, the world applauds the one who really "delivers the goods". This familiar phrase covers the whole business of life, and I don't care where you may look, the same is required of each one, that a patient, well-planned preparedness is absolutely essential in accomplishing ideal results. And shame on the one who has a lesser purpose in life.

I am thoroughly convinced that each one is created for a special vocation and that there is a divinity that shapes our desires and inclinations. We should by all means follow that lead. This is a busy old world and there is no time for idling. All around us new fields are opening to our vision and rich harvests may be gathered if we attend carefully to the preparation of the soil and the sowing. I am indeed sorry for any one who has not caught the vision and sees the tremendous opportunities that lie directly in our pathway. We fairly stumble over possibilities unless we side-step the rich treasures that are seen in the present attitude of our work. Great corporations are hesitating about accepting applications till a certificate from a reliable dentist assures the advisability of the risk. And everywhere from the medical profession, which heretofore, has been slow to affiliate with us, comes the Macedonian cry, "Come over and help us."

This truly is the golden age of dentistry; but what shall it profit us without a definite stand for the proper preparedness of heart and hand? We recall with pleasure one who with enthusiasm shows an intense interest in things that may be for the up-lift of mankind, and who finds his greatest delight in ministering to the ills of humanity. This is the brotherhood of man and the noblest of all purposes in life. The primary object of an ethical calling is the greatest good to the greatest number, remuneration being a secondary consideration. We are more than glad to recognize progress along so many lines in our profession. The gospel of hygiene and prophylaxis is being preached as never before. Research work commands universal attention, and the tyranny of ignorance is fast disappearing before the onward march of preparedness. New methods and theories constantly appear along the horizon, and we confidently look for greater things in the future than we ever dreamed of a short while ago.

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*Read before the Tennessee State Dental Society, 1916.

Manifest destiny lays no claim to the world's work, but we love to contemplate the future activities of dentistry in its relation to the amelioration of the condition of our fellows and to the exalted position to which we are rapidly advancing. Imperial man, ever on the upward march, acknowledges no limit to his ambition. Not even the stars which hold their festivals around the midnight throne have been able to escape his eagle eye in the marvelous calculations of astronomy, and every visit to their neighbors is heralded hundred of years in advance. And in the earth beneath and the waters under the earth he goes forth conquering and to conquer.

The very air we breathe has capitulated to his onward march and the bird-man plumes his wings and soars to heights where no life dwells. And I see the ills that flesh is heir to, break from their prison walls and become amendable to the laws of hygiene and prophylaxis. We are compelled by every law that is reasonable to support with our means and sympathy men who are digging for the truth and who no doubt are making discoveries that will gladden the hearts of all people.

By preparedness in its best and fullest sense, we may see the profession we love to honor take its stand side by side with the most beneficent callings. I know of nothing that will contribute more to our pleasure and progress, than a properly-conducted local society. It is almost unbelievable that any city will be content to be without a well-organized local society; and even in small towns where two or three can meet together regularly and discuss live subjects in this progressive age, a wonderful lot of good may be accomplished.

There must be enthusiasm, an intense love for our profession, that will yield the best results. We must love and enjoy reading about it, talking about it, working in it and making it a part of our very existence and finally to illustrate what it should mean to us, I will relate an anecdote:

A red-headed Irish boy, whose name was "Mikie," was crazy, almost, about his little dog named "Paddy." He came home to dinner and his mother imparted the sad news that Paddy had been killed by an auto. He made no demonstration but looked serious, and again he went to play with his little friends till supper time; after which the nurse took him upstairs to put him to bed, and she too told him of Paddy's demise, when he seemed to awaken from a trance, and began to weep and wail and howl like mad, and his mother rushed upstairs to enquire the cause of the racket, when he said: "The nurse tells me Paddy was killed by an auto this morning;" and his mother said, "Why I told you this noon, but you paid no attention to me," and he said: "Why mother I thought you said 'Daddy.'"

DISCUSSION

Dr. F. W. Meacham, Chattanooga: I think I was supposed to open discussion on this paper, but I have very little to say because I had no opportunity to read the paper so as to prepare anything on it. But I believe in preparedness from every angle. I believe in taking special courses, reading all good journals, studying the cases reported in them and be ready to meet any case that comes to us. There is one point I wish to call special attention to and that is the statement in paper that you should make remuneration a secondary consideration. I think that should be one of the first, as we know that without it we cannot equip or prepare ourselves to give the best services to our patients. We must prepare for all and be ready to do the good in the profession that we are wishing to do.

Dr. Stanley Rich, Nashville: I wish to compliment Dr. Brabson on his beautiful paper and all I can do in discussing it is to agree with the high ideals set forth. There is plenty to be done. There are new fields opening all the time. The only trouble with dentistry today is that it is getting so very scientific that some of us have to work pretty hard to keep up with the times. I do not think we ought to be discouraged, because some of the new things do not prove to be advantageous, but I do agree with Dr. Brabson that we must be on the alert, must read and study, and above all, whenever we can get a chance, even if only two or three, we should get together and discuss things that come up in our every-day practice. We have recently in Nashville reorganized our local society. We feel we are getting a great deal of good out of it, and I would strongly advise every city and town, even though there may not be more than half a dozen dentists there, to get together and form a local society, and it will come in, as some have today, as a part of the State and National. In no way can you learn dentistry so well asby relating personal experiences to each other.

Plaster of Paris

Good plaster of Paris, when well matured and in the fittest condition for use, varies greatly in strength, according to the quantity of water with which it is mixed, e.g.:

1 lb. of plaster to 9 ozs. of water, mixed quickly and well, will stand a breaking strain of 600 lbs. to the square inch.

1 lb. of plaster to 11 ozs. of water, a breaking strain of 450 lbs.

1 lb. of plaster to 13 ozs. of water, a breaking strain of 300 lbs.

1 lb. of plaster to 16 ozs. of water, a breaking strain of 50 lbs.

When plaster of Paris sets too quickly for comfortable use, it is too new; in other words, it has not been allowed to mature by the manufacturer before being sold. It can be made to set more slowly by spreading out each lot, upon a large piece of paper, for an hour or so before it is required.

When plaster of Paris is old and sets slowly, it should be mixed with less water than usual.

The colder the water used for mixing with plaster of Paris, the more slowly it will set.

The older plaster of Paris is the more slowly it will set.

Plaster of Paris kept in a damp place soon perishes.

Due allowance must be made for the varying behavior of plaster of Paris, due to changes of weather.

Plaster of Paris stored in a dry place will keep good for months.

—C. Ash, Sons & Co., Ash's Monthly.

COMPULSORY DENTAL EDUCATION IN THE PUBLIC SCHOOLS BY LEGISLATIVE ACT*

BY C. E. BYINGTON, D.D.S., CHATTANOOGA, TENN.

IN THIS progressive and aggressive age when real merit and achievement is accorded more applause than ever before in the history of time, when sacrifice of life is freely given for science, principle, or a cause, is it not time for a true awakening in our profession to our duties and opportunities?

The untimely European conflict for the last two years has made it possible for the medical profession to advance decades in surgery and to their credit they have readily availed themselves of it; but there is an opportunity for our profession without carnage, but by a well organized and concerted action on our part, to save more lives in the next half-century than the dreadful European conflict has cost thus far, and

OUR MEDIUM IS THROUGH THE PUBLIC SCHOOL

True, the intelligent are growing more sanitary daily, yet the utter disregard of dental and oral hygiene is plainly visible, for statistics show that less than seven per cent. systematically receive prophylactic and dental attention; a most deplorable state, yet in 1900 it showed only possibly about five per cent. receiving such attention. But are we as a profession entitled to any credit for this improved sanitary condition? Most emphatically *No.*

Our National Oral Hygiene Society headed by Dr. Wiley, of Pure Food fame, is restricting its own progress 1,000 fold for fear of unethically revealing its good mission. Our literature, journals and everything pertaining to an improved dental and oral condition that would truly aid the interested public falls into our restricted hands and even our clients haven't an opportunity to see them. It is only when a layman like Herbert Kauffman in his Sunday page with millions of readers, or a Katherine Hillis through *Leslie's Weekly*, with well illustrated radiographs and in a most convincing manner points out, "How Death Lurks in the Teeth"—does the public get a real suggestion of the seriousness of neglected teeth and how they mar or contribute to every individual's health.

THE PUBLIC IS ENTITLED TO KNOW

We know that the dental organs, pharynx and tonsils guard the entrance to the digestive tract, and their normal function has the utmost influence upon the first action of digesting and assimilating all foods. But what percentage of the public appreciate it? We know that only in a limited sense is the gastric juice and intestinal bacterial flora neutralizing pus and septic matter emitting from abscessed or pyorrheal teeth or broken-down roots—but what chance are we giving the public of gaining this knowledge, to which they are entitled?

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*Read before the Tennessee State Dental Society, 1916.

Dr. Charles H. Mayo, newly-elected president of the National Medical Association with his brother Dr. J. W. Mayo, possibly the most renowned surgeons in the world, have been making an extensive study of the influence of diseased teeth to health.

Katherine Hillis reveals the startling fact that more than fifty per cent. of the post mortem examinations made in one of the largest hospitals of New York city revealed that death was not due to the original diagnosis but was directly attributed to diseased conditions of the teeth. Did we reveal this to the public? *No!*

Dr. Osler said, "If I were asked if more physical deterioration were produced by alcohol or defective teeth I would unhesitatingly say defective teeth," and again this strong expression comes from one outside our own profession.

How appalling these facts and how deplorable that the suffering public has no opportunity of being educated to prophylactic dentistry which is striking at the very root of the whole evil. Personally I think our profession should have well-written articles appearing in our metropolitan Sunday papers, emphasizing the importance of oral hygiene and care of the teeth, just as the medical profession of Illinois has appearing in the Sunday Chicago Tribune, written by Dr. Evans, ex-president of the State Board of Health, on "Health and Care of the Body." Neither do I consider this unethical—but instead, most unethical is he who comments unfavorably of you as a dentist to his patient.

TIME FOR A MOSES

Oh! for a Moses to lead our profession out of the wilderness of inert complacency and place it where it rightly belongs in the advance ranks of the leading professions in the world, as a science and healing art, and what a glorious thing to the profession and mankind if Tennessee would take the initiative in this move—do something constructive for our profession that will live and grow for ever and magnify the value of our profession beyond estimate. What is our remedy? I am going to offer you a plan that I consider plausible and possible.

Today in the United States we have about 32 million children of school age. Of this number about 19 million are in the public schools, about three millions in colleges and the remaining eight millions in no school. In the public school it matters not as to the wealth of a school district or ward, how modern or spacious our buildings, you will ever find on entering any room a congested condition and a badly-ventilated room as a rule, with the result that less than one hour after school has opened, every breath of air has been inhaled and exhaled into the lungs of every child, and each time it is emitted it is more polluted, and ere the noon hour your child is breathing from the stagnant pool of diseases.

Many thousands of dollars are expended annually for systems of school ventilation, and the people cheerfully bear the burden of expense because they are convinced of the need of keeping the air of rooms in which their children are brought together as pure as possible; but strangely enough thus far they have overlooked the important fact that the pestiferous odors issuing from neglected mouths are making the problem of correct ventilation almost impossible of solution.

How much money and what is greater, how much health, might be saved by the intelligent attention to the laws of dental hygiene! Yet it is our aim to aid them in every possible manner to attain the highest mental and physical standard. But are we consistent? Most emphatically, *No*, for we know that a physical weakness means a mental decay and that the brain is not developed at the expense of the body, but for a well balanced condition the individual must have a normal or healthy dental and oral condition, a normal and well-developed heart, lungs and digestive organs and brain. With these facts all admitted, we readily can see the importance of educating the youth to the actual value of dental hygiene, and while the care of children's teeth is a parental responsibility—since their preservation affects not only the comfort, but the health and future personal appearance of the child (for a neglected mouth mars the appearance of the most beautiful, while a well-cared-for mouth lends an aspect of refinement to the most homely), we can no longer leave it to parents for more harm results through carelessness or loving ignorance than we can rectify in after life.

Our consistent remedy is through special legislation providing for special taxation, carrying this knowledge into each public school in the States. Is it useless expenditure, is the child of less value than the Berkshire pig? Yet our Government spends many thousands annually to protect the hog from cholera. Is he of less value than the Jersey calf? Yet our Government is spending hundreds of thousands annually to protect them from the hoof-and-mouth disease.

Is it possible to have a strong army and navy without physically equipping the child of today—who is the soldier of tomorrow? No, for it is now an absolute requirement in the army and navy that every applicant must have at least twenty teeth with opposed molars or incisors in a normal condition, or properly filled before they are accepted. As an illustration of this important fact, the recent brief South African war rejected and returned home from the battle field more than 2,500 soldiers, being made physically unable to render service on account of their teeth; and the same problem is confronting them in the European war in like proportions. Proper care for the dental organs is the first requisite of the present intense agitation for "preparedness." To what extent the Government is providing for this we readily can grasp when we note that the last National appropriation for the army and navy was the stupendous sum of 157 millions, and not a murmur from loyal Americans—but not one cent for the preservation of child-health—yet it has been well said and undisputed that the health of a Nation is its greatest asset.

Today we have compulsory school education in almost every State in the Union, and scarcely a dissenting voice, for the good citizen and taxpayer never protests the assessment honestly imposed for the enlightenment of the youth, which means a higher standard of citizenship. But is not good health a greater asset to the present and coming generation than much knowledge? And the dental and medical professions appreciated as never before the importance of oral neglect which is so prevalent. A recent report on the condition of school children showed that in a school of seven hundred pupils, five hundred between the ages of 15 and 18 years of age, fifty cleaned their teeth twice a day, 275 used a brush occasionally and 175 did not own a brush; of the 200 in the primary department from 6 to 10 years of age, not more than 10 used a brush. It is not too much to say that 30 per cent. of all teeth of children between the ages of 5 to 15 in the public schools of the United States are diseased. Between the ages of 6 to 15, Germany shows about 90 per cent. have dental caries, England reveals about 75 per cent. and France is far below England, for they have long since adopted what we are advocating today, for in Paris, by virtue of an act of the Municipal Council, the pupils of the public schools have their teeth examined every six months. We could not reach this almost ideal condition at one stroke but would advocate instead the first important step to this ultimate end by procuring legislation providing for a State Superintendent of Oral Hygiene in the Public Schools, whose duty it would be to organize and lecture or procure a local lecturer for every public school in the State. This could be provided for by a special appropriation or from a special school fund and carried out as a part of the system of school work. It would be the best tax a father ever paid and after once installed and the good results shown, you could not induce the fond parents to discontinue this phase of education.

Let our slogan be, "Compulsory Dental Education in the Public School."

Our motto, "Tennessee First."

DISCUSSION

Dr. Doherty: I would like to say that I do not believe the question of putting lectures before the schools would be a hard proposition if you could get some plan under which the dentists could do it without sacrificing too much time. In my own county of Clinton, the county superintendent came to me and asked me to lecture in the public schools. I did in a few of them, but could not in all. It is rather expensive, when you consider the loss of your time, and in the winter the roads are bad, and I could not make it. But the people there are all anxious for it. If we can get them in the capital city to pass legislation for something of that kind we wouldn't have any trouble about it in the country schools at all.

Dr. Ewell Neil, Nashville: I think the question at present is one of standing around and waiting for the school authorities to invite us to come into the schools and give these talks.

I live outside of the city and send my children to a country school, and we feel that we have a fine school there. We moved there last fall, and my wife said, "Well, what are we going to do about sending the children to school?" I said, "Well, there is a school over there." "Yes," she said, "but it is nothing like we have in the city." But she has had a change of heart. She has been taught to know that that school is up to date in every respect. I had not been in that district very long until my little boy came in one afternoon and he said, "Daddy, my teacher asked me the other day if you was a dentist or physician, and I thought you was a dentist, and she told me to tell you to come by the school, as she wanted to see you." I did not go until school was about ready to close, and they were having some closing exercises, and I met the teacher that night, and she said, "I have been trying to get hold of you all season. We need you over here." Well, they had about ten days' time left after that, I think, and every night when that boy came home he would say "Daddy, the teacher wants to know when you are going to come again." I didn't have time to go out, or didn't feel I had the spare time to go there and give them an hour. Yet there is the school teacher pleading with me daily to go and give the children a talk on mouth hygiene, and I have not seen fit to give some of my time to that work. And I think the fault lies right here, and there, and there. It is not with the school authorities at all. They are ready to have us come in and do this work, and I think we are very derelict in our duty when we fail to go. I do not believe it will require legislative enactment.

Dr. Harwood, Morristown: The school authorities in general throughout the state are ready and willing and anxious, and really standing with outstretched arms for us to come in and help them. I know in Morristown, in our county, I was solicited at the beginning of the term to make some lectures, and did so in Morristown, and went to each school two or three different times. The first or second lecture I believe I gave out there, two of the teachers came to me and wanted to know how they could interest the children. I had gone through a similar experience in another county, and I told them a good way to interest the children was to offer them a little prize for efficiency at the close of the term, and along the latter part of the term, they called me and asked me if I would make an examination of the children in that particular room. I did so, and afterwards she asked me if it had done any good, and I told her she could answer the question for herself by going to one of the other rooms which had not offered a prize to the one having the cleanest mouth at the close of the term and make a comparison. You know they always say that the shoemaker's wife goes barefooted. Out of 35 children in that school, you could take 35 men in this audience and I dare say there was a greater per cent. of unkept mouths here, than there were among those 35 children. We do not look after our own affairs, and it lies within ourselves to make the start. I do think that the legislation would give a better working basis, and more good possibly arise with a majority of the parents toward their children in some localities, and I do not oppose the idea of legislation at all.

Dr. H. A. Holder, Gallatin: About six or seven years ago I was chairman of the committee which was appointed from this body, to write a chapter to go into the physiologies to be used in the schools in Tennessee. We wrote that chapter and went before the State text book committee and got them to make the provision with the publishers that whichever book was accepted for use in the public schools in Tennessee, this chapter would be incorporated in it. There were a number of books under consideration from publishers throughout the United States, and they got all of them to agree that if their book would be selected, this chapter would be put in their work and would be used for the next five years. The chapter was used in the public schools for the succeeding five years. At the end of that time a new physiology was selected and has been in use since. While it has some reference in regard to teeth, it has not the same subject that the other chapter had. Unfortunately, we were not able to get in touch with the men who selected the last text book, and did not get in as much work as we had theretofore.

One or two of the gentlemen who have discussed the paper have suggested that we as dentists can do a great deal individually along this line, and I want to emphasize what they have said. We certainly can do a great deal of work. We can educate our own patients; we can talk with the school authorities in our own communities, and these schools are ready and are willing and are anxious for us to come there and give them instruction. In my own town I was requested to talk to the public schools, the city and the county high schools, on this subject of mouth hygiene, which I did. Now it took a little of my time to get up that talk, and took a little of my time to go and give that talk, but we must remember we cannot live simply for ourselves. We have got to go out and give something to the public. We have to get out and make some sacrifices in order that this educational proposition may go forward. And I hope when Dr. Neil is called on next year he will go out and give them a talk, and I am sure that a great many others here have had a similar request made of them. I hope when these requests are made you will consider it a duty to your community and to yourself and to your profession, to go there and do the very best that you can.

DR. C. E. BYINGTON, (Closing): I appreciate the discussion, and I want to go a little further and give my personal experience in how eager I have found the schools to avail themselves of our kindly offer. This was while I was in Illinois. I was prompted purely by a feeling that the profession ought to do something of that character. In the first place, it stamps us as a profession and individually as aggressive and progressive, and as I have suggested briefly in this paper also, our profession is not as active in going ahead and making itself felt as it should be. In Illinois, in a town of about 9,000, I went for the last eight years before a high school and lectured annually. I was given two periods, or, in other words, 80 minutes. To show what interest they took in it, after the first year the professor assigned to physiology asked me to save extracted teeth. He took them to his high school pupils and had them mounted with sealing wax, as we did in our freshman year, and they were then taken to the manual training department, and there they got some idea of the density of the tooth structure and the relation of the pulp to the general anatomy of the teeth. Now, if you go before a school and emphasize such things as the importance of the use of the tooth brush and the correct use of it, and the necessity of the preservation of their teeth, you have certainly taught them a lesson that is valuable to them throughout life.

The professor told me that he never saw such improvement in the actual care of teeth there, and you could see it, too. I could see it in the patients coming to the office. It stimulated pride. You cannot appeal to children from the standpoint of health, but pride—that a well-cared-for mouth will beautify the most homely face, will appeal to children, and they will inevitably benefit their health in observing this.

Dr. Harwood, I believe, misunderstood, as perhaps the other gentlemen discussing the paper did, my idea with reference to legislation. I do not mean legislation from the standpoint that they viewed it. I mean legislation in this sense: that an appropriation be made for a superintendent, as you might term it, of oral hygiene in the state. Let that be discontinued in a year or two, after an organization is perfected. Everybody's business is nobody's business. Have some man going around the state and jog up the profession to the giving of these lectures. Do not imagine it is a sacrifice, for it is not. It will come back to you in dollars, if you want to view it from that standpoint. You take the percentage of grown people today that are receiving dental education, about 7%, less that 15,000,000 people out of 100,000,000 seem to be receiving systematic dental attention, and you can readily see where the trouble is.

Treating Perforations of Root

At this point allow me to state an easy method of treating and repairing a perforation of the pulp chamber or the canals—as this will occur in the best of regulated practices—a sedative dressing of equal parts of oil of cloves and beechwood creosote should be placed over the perforation and allowed to remain until the canal can be dried without hemorrhage; the perforation should be varnished with a solution of rosin in chloroform, and a piece of warm gutta-percha should then be placed over the opening and pressed to place with a warm plugger. If the perforation is near the apical foramen, a gutta-percha point will usually obliterate it. These operations should be checked by an X-ray picture.—*F. C. Pearn, Northwestern Journal of Dentistry.*

PRESENT AND FUTURE STATUS OF OUR PROFESSION*

BY WM. F. STONE, D.D.S., CHATTANOOGA, TENN.

WE READ in history dating back to about 1750 to 1760, of the marvelous feats of such men as Isaac Greenwood, James Daniel, Robert Woofendale and James Mills, in re-planting and transplanting of teeth, of their skill in carving artificial teeth from blocks of ivory and their use of these carvings in the construction of artificial dentures, and of various operations upon the human teeth.

We move down to the period of about 1790 and we find others of considerable renown, among them John Greenwood who apparently was skilled in the dental arts of this period, as we find him serving the president of our country in the capacity of dentist with apparently satisfactory results.

About this same time—for convenience we will term this the "Ivory Age" in dentistry—we find three men with one interest in common—Lemaire, Flagg and Gardette—forming the nucleus for the dissemination of dental knowledge and education in this country. From this period on down to the present there has been a constant enlistment of noble men who have sacrificed health and possibly financial success to the cause of dentistry, for its upbuilding and for its further advancement—and just here I must say that our "Volunteer State" harbors some of the most worthy men of the cause, and men whom history cannot disregard, men who have spent their entire lives and energies for the advancement of our profession.

Naturally we have a great latitude for the imagination when we contrast the "Ivory Age" with the "Gold Age" of a few years ago, and the present or "Porcelain Age." Today with some 40,000 to 50,000 skilled practitioners within our states, all of whom are occupied, and still a large percentage of the public suffers, we wonder how some three, four or five practitioners took care of our population back in the early days.

Today we are equipped with every conceivable apparatus, appliance etc., for the purpose of rendering our patients the most and the best service. In the early days our professional brothers, with great muscular force and the aid of something resembling a pair of modern ice hooks, proceeded to deliver an offending molar by main strength, while a few assistants were employed to hold the fighting victim. Today, while the patient sits calmly and allows us to insert into the tissues a few drops of a magic fluid, or sit and absorb a few inhalations while they nestle gently back into the arms of "Morpheus" and dream of the lovely, while we relieve them of the source of their dental troubles. Today we treat and save and render useful those very organs which only yesterday were considered worthless and their preservation for future use impossible. But stop and consider—what are we doing today? I speak of the masses of the profession and not of the laggards, or the extremists, or the leaders of the profession. We are a body of individuals spending our energies repairing the ravages of decay and neglect of the oral cavity and dental organs. This may seem a strong statement, nevertheless I believe it true—we as guardians of the oral cavity are responsible for the necessity of repairing and replacing lost dental tissues. We treat and cure and try to cure abscessed teeth, we crown and fill badly broken-down teeth, we replace missing ones with artificial ones, we treat and treat *at* pathological conditions of the soft tissues of the oral cavity, we correct and correct *at* mal-posed teeth and mal-formation of the jaws. All told, we repair the ravages of decay and neglect.

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*Read before the Tennessee State Dental Association, 1916.

Viewing this work from an humanitarian standpoint, it is a noble work on our part—but from a scientific standpoint, *is it?* The medical profession threw out a challenge through its spokesman, Dr. Chas. H. Mayo. We must deliver the goods. Preventive Dentistry is our goal; it is imperative that we reach it.

The architect evolves plans for an elaborate edifice which proves the wonder of the age, yet if he overlooks or fails to incorporate in its construction the essential elements or materials to immunize or safeguard the structure when imperiled by destructive elements to which it is likely to be subjected by nature of its location or environment, his works are a failure and worthless.

This same rule is applicable to our profession in that we take charge of the child at a tender age, and are entrusted with the designing—the architectural plans—of the oral cavity of the child, and here it becomes our duty to bring about a normal development of the tissues involved in the formation of this cavity, and to bring into action the necessary physics, chemistry, training, etc., to preserve these tissues and to prevent the manifestation of pathological conditions.

We are today practicing too much mechanical dentistry—using our digits to the neglect of our convolutions. The time is now on us when we must increase the size and number and quality of our convolutions; we must partake of and assimilate more of chemistry, more of histology, bacteriology, pathology; we must learn to diagnose properly, and treat correctly. Diagnostic work is being forced upon us, we must meet this emergency with honors—we can, and we will.

With the hearty co-operation which we are receiving from the M. D.—with the rich fields for research, which the Roentgen Rays has opened unto us, and with the wonderful increase in ability which the graduate of today must possess over his older brother, due to the more thorough course of training given by our colleges in histology, bacteriology, pathology, therapeutics, chemistry, etc., and with the wonderful aid we are receiving from our newly established National Research Institute, ten, or I may say five years hence, dentistry must necessarily have been revolutionized, and we will, let us hope be practicing Preventive Dentistry.

DENTAL PEDIATRICS*

BY J. A. GARDNER, D.D.S., MEMPHIS, TENN.
DEAN COLLEGE OF DENTISTRY, UNIVERSITY OF TENNESSEE

THE ALL-ABSORBING subject before all branches of the healing art today is that of prevention, and to my mind there never has been a subject more worthy of our brightest minds; no subject that calls for more profound thinking; no subject that means more for humanity. And out of this realm of thought Dental Pediatrics was given birth. And I feel confident that from the thorough understanding and the proper promulgation of the principles of dental pediatrics, will come true prevention.

When we refer to prevention in dentistry, it should not mean the cure of an abscess or the removal of an abscessed tooth, with an effort to prevent systemic infection; but prevention should mean the employment of such measures as to prevent the occurrence of, not only an abscess, but the attack of caries or any other condition that would lead to focal infection in the mouth. I admit that the dental profession has a great field to cover, in an effort to overcome the ill effects in the permanent teeth, due to the neglect of the temporary set, and we must do all in our power to take care of the situation. But how much easier it would be to employ the proper preventive measures with the temporary teeth which would make it unnecessary for a single pulp to be lost, thereby allowing the permanent teeth to be erupted in a physiological manner, avoiding irregularity of the permanent set and its bad effects, and reducing the per cent. of susceptibility to caries, pyorrhea, etc., to a minimum, and eliminating the far-reaching effects of focal infection in the temporary teeth. Our public school physiologsits tell us that bad temporary teeth mean deficient mentality.

Therefore, since dental pediatrics is the science that has to do with the treatment of a baby's mouth and teeth, it is in this branch of dental science that our greatest opportunity lies. However, on account of the peculiar conditiosn that exist in the treatment of children from the age of nine months to thirteen years, both from a professional and from a business standpoint, it is best that it be handled as a specialty in the practice. But it is incumbent upon every dentist to join in the mother's educational campaign. In fact, it is necessary for the mothers to become equal partners, as it were, with the dentist, or dental profession, in this great undertaking, if we are to hope for the greatest good to be accomplished. Therefore, it is up to the dental profession, individually and collectively, to educate the mothers as to the necessity of dental pediatrics, that they may, of their own knowledge, realize the importance of having the proper preventive measures employed in their babies' mouths before it is too late. You will find that the mothers will respond to the slightest suggestion which is for the best interest of their children. But it is appaling to know of the ignorance that exists with the laity relative to the dangers in the neglect of the temporary teeth.

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*Read before the Tennessee State Dental Society, 1916.

I will go further, and state that it is incumbent upon the dental profession to educate the physicians along these lines, for it is not an uncommon thing for a physician, when asked for information by the mother relative to the temporary teeth, to say, "It is only a temporary tooth and of no consequence, since you are going to lose it anyway; go to your dentist and have it extracted." Therefore, it is no wonder that the average mother never consults the dentist until pain has forced the children to the dental office. They do not know that if those little temporary teeth had the proper attention, that they would never decay and give rise to mouth infection. They do not know that an abscess at the root of a temporary tooth will cause gastrointestinal disturbances, kidney trouble, rheumatism, which in many cases affects the heart, and last but not least, they do not know that if those temporary teeth are given proper attention that they will be exfoliated in a physiological manner and thereby allow the permanent teeth to be erupted regularly and in a healthy mouth. They do not know that it is necessary for those teeth to have constant care and attention by the dentist at intervals and every day by the mother, beginning at the time of the eruption of the first baby tooth. They should be enlightened.

Now, gentlemen, if it is true that mouth infection will cause rheumatism, and that rheumatism in children will affect the heart, then we dentists have it in our province to prevent heart trouble due to mouth infection. If focal infection in the mouth can cause kidney disease, systemic infection of various kinds, then we are not doing our duty if we do not prevent focal infection in the mouth. And the way to get an opportunity to employ preventive measures that will avoid these conditions, is to get the baby in the dental office at the age of nine months at the latest. And the only way to get the baby in the dental office at nine months is through the education of the mother. The way to educate the mother is for every dentist to do his part in the instruction of the mother. And the way to get an opportunity to instruct the mother, is by letting the officers of the various mothers' organizations, such as the Parent-Teachers Association, know that you are willing to give the instruction. If there is no Mother's Club in your city, it is your duty to encourage such an organization.

Again, if it is true that a great number of the eruptive fevers are contracted through cavities in teeth, then it is up to us to prevent the much-dreaded scarlet fever and measles, both of which so often leave the child with one or more diseased organs.

I know that most of you are familiar with exanthematous necrosis. Can you conceive of anything more horrible than death from exanthematous necrosis? And yet, it is within the possibilities to prevent it. Will we do it? I know of nothing more difficult, if not impossible, than to bring about a normal condition in the mouth of a child from two to three years old, while one single tooth has been allowed to abscess. And how much greater is the problem of overcoming the systemic effects from that infection!

A child at the age of two to six years is a great deal more susceptible to the influence of septic matter than an adult. And yet, we are informed by such men as Charles H. Mayo and Dr. John B. Murphy, that a large per cent. of our heretofore unaccounted-for ailments are due to mouth infection. These facts have been thoroughly demonstrated by the X-ray. I had under my observation a short time ago, a man forty-five years of age who had been suffering for some time from kidney trouble, high blood pressure, indigestion and rheumatism. After many unsuccessful attempts to find his trouble, after several courses of treatment without results, his mouth was X-rayed as a last resort. Seven abscessed teeth were discovered and after their removal he uninterruptedly recovered from all systemic troubles.

Since the campaign for "Better Babies" has been on in Memphis, Tenn., Prof. David S. Gardner, who has the Chair of Dental Pediatrics in the University of Tennessee College of Dentistry, tells me that he has been astounded at the large number of children brought to the free clinic and to his private practice at the ages from two to three years, with from one to four abscesses. This condition should not exist. And I fear the burden of the blame falls upon the shoulders of the dental profession, for in the doctor's report from the examination of five hundred babies, ranging in age from three to eighteen months, he found the following conditions: Only one-half per cent., or one child in every two hundred, with any sign of decay at the age of nine months. Only one per cent. of irregularity in the children from the age of nine to eighteen months. This goes to prove that it is not a hereditary influence, and that most of the children have had the proper diet for development and eruption of the teeth, and they are as a whole in excellent condition when they are erupted. And that the trouble that we have from caries, which leads to mouth infection, can be prevented by the proper co-operation between the mothers, the physicians and the dentists.

Gentlemen, there never was a time when the profession had such an opportunity to do great things for humanity and to bring honor and glory unto itself, as it now has through the practice of dental pediatrics.

DISCUSSION

Dr. J. D. Towner, Memphis: I recognize, as you doubtless all do, the vast importance of the subject of dental pediatrics, but at the same time feel that possibly I am the most incapable among you to discuss intelligently such a paper. The reason for that feeling is the fact that I do not have the opportunity of seeing or practicing for very many children. The work in dentistry that has been most before me has been that of treating diseases of the peridental membrane primarily, and those do not occur usually in very young children, though the most extensive case of pyorrhea I ever have seen, the most resistant to treatment, was in the mouth of a child thirteen years of age.

There are two angles from which we must approach this subject, both leading to a discharge of our obligation to the child. One is that of advice, the other that of actually performing the service. In both instances we must know what to do, absolutely. I shall take first the phase which deals with consultation and advice, or broader, the educational part of the work. We all must realize that in the child we have the opportunity of beginning preventive measures where they should begin. We must know that the prevention of disease in the child's mouth is absolutely necessary, not only to physical well-being at the time, but to a proper healthy oral condition when the permanent teeth come into place. So as to those of us who do not, on account of opportunity or preference, deal with actual conditions of the alleviation of those diseases, we must know what to do, and discharge our obligation to the child and the parent by a process of education. That to my mind is most important, for this reason: We should realize that no matter how soon we see a child, the mother must be that child's first dentist. Now, that is an actual fact. If that is the case, then our obligation is to those patrons of ours who have children, in that we suggest these things to them from time to time, whether we ever have occasion to see any of their children or not.

If we think sanely about the proposition, and the obligation incumbent upon us to try conscientiously to discharge that duty in order that no one may point the finger of scorn at us and say, "if you had only told me," we must educate, and the first place to begin the education of the patient or the education of the prospective patient, is in the dental office. That can be done at the chair in a few minutes, by a few well-directed words explaining this and that, and it will be effective, because we all know that there is nothing more appealing than anything that influences the well-being of our offspring. We can point out the different conditions that should be noticed and prevented, and, if they are present, relieved. Then we can appear before Mother's Clubs, we can give our co-operation, our actual services to the different clinics in our different cities.

In Memphis, if you will pardon me, we have gone at it in this way: We have established a clinic in the Juvenile Court, where 26 of the dentists give an afternoon each month to that clinic, where we see none but children, and those children of the indigent, who cannot afford the services of our respective offices. Then we have established a clinic in an orphanage, where those children are given competent care. Then in the college clinic, certain afternoons are set apart for dental pediatrics, at which time a demonstration and operation is given to the students, and at the same time, relief is afforded to the little patients.

The subject of pediatrics must be handled as a specialty to be made a success of, because as was mentioned by Dr. Callahan last night, it is a difficult one to manage, both from a professional and financial standpoint. Those of us who have at times been employed in the alleviation of suffering in the mouths of parents do not have the time and cannot give the time with the insufficient compensation which follows, to the child as possibly our natures or our inclinations would suggest.

Personally, if I had my choice in the selection of a specialty in the practice of dentistry, it would be pediatrics. My whole nature is appealed to by helplessness, whether it is in a child or in an adult, but especially so when that appeal comes from the helpless child for whom we are responsible. The proper time to get the patient in the chair is nine months, as the paper has intimated. By so doing, we are able to prevent caries, we are able thereby to prevent focal infection at a time when it is most disastrous to the individual, and, as Dr. Callahan remarked last night, many a child loses its life through mouth infection. That fact cannot be disputed, and it will not be disputed by intelligent people.

Dr. D. M. Cattell, Memphis: I have nothing to offer in regard to the paper by Dr. Gardner other than this: Dr. D. S. Gardner—this paper is written by Dr. J. A. Gardner—but Dr. D. S. Gardner has undertaken a work in college that seems to be new under that title at least, or rather the title seems to be new to the work he is doing, and while he has taken hold of it, the wonder of it to me, as superintendent of clinics, is the amount of interest that has already been aroused, and what a man who pays particular attention to the little ones can get out of it. He will see things that I, looking the mouth over three or four times maybe, would not see. He sees it in a moment and knows what to do, where I wouldn't know, yet seeing a hundred cases maybe, to his one It shows what one can do by making special observations along certain lines. They become so much more proficient. And now just a word for myself. It does seem to me that this is the field for that dental nurse that we are going to have to help us out, a thing that I want to see pushed forward, sooner or later, and made a subject for thought and discussion in our bodies.

DENTISTRY IN HONG KONG.

There has been practically no regulation of the practice of dentistry in Hong Kong heretofore. The profession has in general taken a very natural development, with the result that from time to time serious trouble was experienced by the public, and cases of serious malpractice were quite common.

In the free-and-easy course followed, the high-grade practice fell to a few high-class American practitioners, who have been in the colony for years and whose business has resulted from careful and high-class work. Naturally this class of work called for comparatively high prices. The rest of the work in the earlier days went to Chinese practicing in the native way or to more or less nondescript practitioners who usually consisted of former employees of dental practitioners here or elsewhere who had succeeded in acquiring a more or less superficial knowledge of the profession. In recent years there has developed a middle class, which includes Chinese and Japanese graduates of dental colleges in the United States or the Far East. These graduates have charged lower prices than their Caucasian competitors, while offering more or less technical skill under modern training.

THE NEW REQUIREMENTS

The new Hong Kong ordinance and regulations, while recognizing those actually practicing in practically all of the several classes now existing, permits of the offer of modern dentistry only by those qualified by modern training. The new system is embodied in an ordinance which was passed last June and which has just received the approval of the secretary of state for the colonies, and in certain regulations. (A copy of the ordinance may be had from the Bureau of Foreign and Domestic Commerce and its branches.)

The ordinance provides that no person shall offer himself to practice as a qualified dental surgeon who is not registered in a Dental Register kept by the Colonial Government. For registration a person must apply in writing with proof of such qualifications as shall be prescribed by regulations, the ordinance further providing that persons now practicing, or others showing proper qualifications, may be exempted from the operation of the ordinance upon a proper showing to the Governor-in-Council. The ordinance gives the actual power of prescribing qualifications and of establishing the system to the Governor-in-Council, and the regulations above given are those authorized in the ordinance.

The chief effect of the new system will be to compel American practitioners to secure British licenses, for while provision is made for the granting of licenses called Certificates of Exemption here, there are restrictions about them which will probably make the securing of a British license advisable or advantageous.

CORRESPONDENCE

GOSSIP ON THE RECENT OHIO STATE MEETING

BY FRANK W. SAGE, D. D. S., CINCINNATI, OHIO

Editor Dental Summary: It certainly was a fine meeting. You fellows who stayed at home missed it, the meeting, of course, and much that was instructive, profitable and entertaining. Any one of the three lectures by Price, of Cleveland; Fischer, of Cincinnati University; Rosenau, of Harvard University, was worth going far to hear; worth even the inconvenience of two or three nights at a third-class hotel, if it came to that, as it did, with some of us. Dr. Price's illuminated lecture, in particular, was of a description to arouse enthusiasm in a promiscuous audience, unless wholly insensible to the lure of fantastic, microscopic life. It was really superb, enthralling. As much, perhaps, might be said of the others mentioned. Others might be named hardly inferior to these, in point of attractiveness and of practical worth.

One could not but contrast the Ohio State's meetings, years ago, when home talent had the call (often no very effectual call), with the doings of this past week. In these earlier days there was usually a dearth of essayists; any novice might come in and read a paper, however crude, pointless, inadequate it might be. The main procedure seemed to be to hire a hall and trust to luck. What luck usually brought was a discussion of means to defeat the Goodyear Rubber Company, which was deemed oppressive because of its exacting of the dental profession an annual fee for using its patents. The fight was ever on. Or, a little later, it was the all-absorbing subject of capping pulps. For heaven's sake, I hope we are not to have a revival of that fad, since Dr. Fischer declared that dentists should strain every nerve (or words to that effect) to save pulps alive, the alternative being extraction for all aching teeth. Years of experimenting demonstrated conclusively that you cannot cap aching pulps successfully. But that is another story; let's back to our mutton.

What an uplift there was in those three lectures, especially the three I have mentioned. Some thought Dr. Fischer too radical in opposing all efforts to save aching teeth. Even our own beloved Price metaphorically speaking, threw up his hands, declaring he had vainly tried to sterilize canals effectually, and was discouraged to the extent that he was despairing of successfully filling roots. Of course, it is understood this statement must be taken with all due allowance for momentary depression of spirit. But such an expression from such an authority certainly militates against root-canal treatment not of the very highest order of efficiency. There were numerous dissenters, either openly expressing opposition to these radical views, or later, in the lobbies, venting their opinions.

There were eleven hundred dentists present at the meeting, so I was told. I do not know; this only I do know, that many friends were present whom it was not my fortune to meet. Such a crowd was it that it was even difficult to get a chance to scan the hotel registers. Let it be hereafter remembered, that a dental convention held in a place near a state line, is going to attract numerous outsiders from adjoining state or states. It is said that application for rooms at the first-class hotels was vainly made even a month before the date of this meeting. *Verbum Sap.*

En passant, I want to say the modern dental convention loses somewhat in interest in this respect, that little opportunity is afforded the off-hand debater, who formerly arose in his seat and commended or dissented, after the reading of a paper. There was in all that a certain comradship, what the French call *camaradarie;* an interval of relaxation from the formal, of familiar and intimate comparison of views, often quite edifying. If, however, nobody happened to be moved by the spirit, the effect was sometimes as discouraging as the lapses in an old-fashioned prayer meeting, so trying to faithful pastor and deacons. All in all, then, it may be it is well enough not to rely on spontaneous offerings that may or may not come to a realization.

The supper given Wednesday night demonstrated the fultility of attempting discussion of dental problems, while a meal is in progress. The usual custom has been to reserve the speech-making until coffee and cigars. Appearances indicate that dentists who buy supper tickets do so expecting to enjoy an occasion of relaxation, of informal, jovial indulgence, and off-hand chaff and badinage, it may be, not a formal symposium on some dental subject. It appeared that Dr. Rauh's stentorian appeals for order, as he introduced the speakers, was regarded with a degree of disfavor, in certain quarters remote from the speakers' table. By way of sustaining Dr. Rauh's vehement protestations, our worthy president, Tim Way, arose and, projecting his voice into illimitable space (shattering a few electric light bulbs, someone declared), commanded order. Various members, righteously indignant, looked daggers at the delinquents, further away. The question arises, who was right; the chairman who thus peremptorily ordered order in order that (bless the English language) an orderly presentation of things previously ordered (there we go agin), might be set forth; or the fellows who, perhaps referring back to previous experiences of "suppers," inclined to defy this unheard-of regulation?

Let us have an understanding hereafter, that any curtailment of the usual privileges of the banquet hall be announced in advance of selling tickets.

At the dinner, however, the most pleasurable feature I think it will be generally conceded, was the address by a Cincinnati young lady, associated with the work of the Oral Hygiene organization, Miss Anna Bunten. She was among the last of several speakers. During the interval most trying to the waiting speaker (that of the chairman's introductory remarks), the lady appeared to the writer somewhat pale, tense, so that we feared a breakdown. She, however, managed with the assistance of two gallants (dentists) to mount her chair, and delivered herself of a witty retort to some funny "crack" of the chairman, which elicited tumultuous laughter and applause. On resuming her seat her auditors broke into a roar of applause, endangering the chandeliers. Her's was the ovation of the evening. Not to make invidious comparisons, her's came pretty near being *the* address of the evening, as well.

As to the clinics, the effect of censoring them was observable; fewer "chestnuts" (beg pardon) usurped a place at the tables. But with all that has been suggested and adopted, it must be confessed that we have not yet reached a solution of this vexing clinic problem. The new arrangement whereby members are assigned by ticket to a given room or space, is open to the objection Dr. W. S. Locke, of Cincinnati, called attention to: the dentist must, perforce, listen to a clinic whether it interests him or not. How can that be obviated?

While the acoustic properties of Memorial Hall, where the convention met, were good, several clinicians, standing away from any wall in open space, talked at a disadvantage. Such a speaker, turning his back a moment on his audience, sent his voice off into space, the hearers losing his words. A blackboard, or a screen, calculated to reflect back the speaker's voice, would remedy that fault. Above all, let clinicians avoid turning their backs to the listeners. Much is thereby lost, eve fn underavoring circumstances.

The matter of seeing and hearing is of utmost importance in clinics. How can we improve on present methods? As to seeing, first of all:

Mr. Harter, manager of the Summary, made an excellent suggestion in the November issue, as to furnishing models on a gigantic scale, which everybody might easily see. But, oh, the expense of this.* Still, over and against all that, is the great advantage certain to accrue. I recall Dr. W. E. Cummer saying not once but a dozen times: "I am sorry you folks back there cannot see this." The models he held up to view were perhaps two to five inches high, and as long. Some were much smaller. Now, what with the average clinician's having small models, and his holding them so that his hand half conceals them, very few gain any idea at all of the demonstration. This defect is so great, indeed, as to raise the question whether our clinics are not actually a failure. Beyond doubt, most of them are so. Only a few "pushers" get near enough to the clinician to derive any benefit from his expositions.

If we cannot have gigantic models specially prepared, we can at least have the smaller ones so mounted as to be free from interference by the clinician's embracing hand. Mount them on a swivel, two or three feet, even higher, above the table, and let the demonstrator use a pointer, which will not get between the audience and himself, as does his hand.

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* (Pardon this girly-girl expression.)

Another suggestion: On no account pass specimens, samples, mounted whatnots, around among the auditors. What results from this? In a few minutes the speaker finds himself vainly trying to interest his auditors in what he has further to say, everybody's attention being diverted by the interesting specimens he has passed among them. Each specimen leaves in its wake a buzzing throng, commenting, commending, objecting, criticising, paying no heed to the speaker. A more effectual way for demoralizing an audience and dissipating his own further efforts could hardly be devised.

Still another suggestion: In a large hall it frequently happens that darkness coming on, a passing cloud or nightfall overtaking the speaker, his drawings and models loom up indistinctly, spoiling all effort to make his talk intelligible. Let every clinician have a small pocket electric light, which a volunteer assistant, in an emergency, may turn upon the models or drawings.

The fact cannot be disguised; our clinics are not a success. Even the reporting of them is an impossibility. Should they be dispensed with? Should a supreme effort rather be made to have each clinician give his demonstration privately, at his leisure, during the sessions, to a reporter, expounding matters to him in such a way that a printed description would really describe and make all plain and comprehensible? Do we ever stop to consider how few explanations in dental journals of even the simplest processes, are so worded as to be comprehensible to a reader of average intelligence? The fact is, to describe in printed words a mechanical process, even with accompanying illustrations, is often a far more complex matter than most of us suspect. If this were not true, we would hear of far more adoption and use of processes attempted to be described in journals. As it is, dentists find these descriptions too hard to understand, and so go on in the old way.

As I said before, the acoustic properties of the hall were fairly good, much better than in some halls where we have attended dental meetings. Thus, at Indianapolis, a dozen years ago, so long ago that no member of the executive committee for that occasion is likely to call me out and shoot holes through me, and no owner of the hall is liable to write me a scurrilous letter—now where was I? Oh, yes, as I was saying, the acoustic deficiencies of that hall were enough to make any convention of dentists or other professional men, a lamentable failure. When will executive committees learn to be on their guard against undesirable halls of this sort?

Now I have spun this out to such length that I have got to begin all over, saying, the acoustic properties of the hall were fairly good, better than the oratorical resources of some of the speakers. If some of them had had more rotund voices they would have appeared to better advantage. A notable exception was Dr. Henry Germann, of Cincinnati, an announcer *par excellence*. Every word he uttered, making announcements, rose clear, thunderous, commanding instant attention even in the midst of tumultuous disorder. Some of you feeble-voiced ones, imitate Dr. Germann.

In painful contrast with him was one speaker who was so weak in voice that we were reminded of the Eatanswill Political Meeting, in the Pickwick

Papers, on which occasion the Mayor, attempting to make a speech, was advised by one in the audience to send a boy home to see if he had not "left his voice under the pillow." Why don't some of you weak-voiced men learn the simple remedy of deeply inflating your lungs a dozen or a score of times, at the same time working the abdominal muscles, before you rise to speak. That is what our critic in the literary society and debating club, at Denison University, used to insist on us students doing. You will be surprised to find how it gives you fullness of voice.

The more I think about it, the more am I impressed with the need of improving our clinics. If I were on the executive committee, I should see to it that all seats, hinged seats in the hall, were oiled at the squeaky places. If I were chairman, I should stop the essayist in the midst of his reading, if need be, to make the admonition more impressive, and consume with the fire of my terror-inspiring glance, the fellow or fellows who come trampling like cattle into the hall, or leave the same with indecorous disregard of decency and good order. If possible, I should have a regularly qualified and sworn in master-at-arms, to enforce order. I should give the impatient, restless ones a chance to go out, now and then, suspending, meanwhile, all proceedings.

But all this has little to do with the matter of the clinics, of which I began to speak. One improvement I suggest: Let every clinician study to know exactly what he needs to explain, leaving some of the obvious things to the observer's imagination. Keep fingers and hands out of the way, as much as possible. The same as to one's person. One or two of the clinicians at Dayton, addressed themselves solely to the more convenient half of their audiences, their persons preventing the other half seeing.

Sometime I am going to give this matter of clinics real study, and report on my conclusions. To see defects is one thing; to correct them quite another.

In a restaurant, breakfasting, I met a dentist who was venting his displeasure at a newspaper reporter who had presumed on making light of the dentists, in headlines reading somewhat like this: "Meeting of the dentists,—*pulling* for (something or other), *filling* an engagement at Memorial Hall, *plugging*, etc."

He seemed surprised that I inclined to regard it lightly, himself deeming it flagrantly disrespectful, casting odium on the profession, and all that. It is worthy of remark that the same paper, *The Dayton Journal*, I think it was, had an editorial complimenting the dentists, rather enthusiastically expressing admiration of the profession, as a body and individually, with candor unmistakable.

No flippant newspaper reporter can hurt our profession. Let him amuse himself by caricaturing us, if he so desires. Ten to one he has no malice whatever. The public knows and respects us as never before. It all depends on the individual, just as it does in the law, or the ministry, or medicine. Let us appreciate that fact.

EDITORIAL

RECENT MEETING OF THE OHIO STATE DENTAL SOCIETY

Another successful meeting of the Ohio State Dental Society was held in Dayton, December 5-7. While the attendance was not quite so large as that of last year, it was large and much enthusiasm was manifested.

The lectures and clinics were good and enjoyed by all. Sessions began promptly on time, a feature we hope will be carried out at future meetings. The Oral Hygiene exhibit was excellent and reflected credit on those who arranged it. As soon as the proceedings can be gotten into shape for publication they will appear in full in THE DENTAL SUMMARY.

The society passed an amendment, by unanimous vote, increasing the dues for next year (payable in the fall of 1917), to $5.00. Three dollars of this goes to the National Dental Association, one dollar to the Journal of the N. D. A., and one dollar for the maintenance of the Research Institute of the N. D. A.

A committee was appointed to convey felicitations of the society to Governor-elect Cox.

The library committee reported 1649 bound volumes in the Ohio Dental Library.

The name of the committee on Education and Oral Hygiene was changed by amendment to, Educational, Industrial and Oral Hygiene Committee.

A set of books (dental) was presented Dr. M. Gruenebaum, Cincinnati, in recognition of assistance in preparing the Oral Hygiene exhibit.

One thousand dollars was authorized for use of the Oral Hygiene Committee during the coming year. Two hundred dollars was donated to the G. V. Black memorial fund. Two hundred and fifty dollars was donated to the Research Institute.

A committee was appointed, to report in 1917, on the practicability of excluding all but members in good standing and special guests from all sessions of the society.

A vote of thanks was extended the Local Committee, the Press and the National Cash Register Company, who entertained the society on Thursday afternoon.

Officers elected for ensuing year were: President, F. M. Casto, Cleveland; first vice-president, Z. N. Wright, Dayton; second vice-president, W. H. Hayden, Youngstown; secretary, F. R. Chapman, Columbus; treasurer, S. D. Ruggles, Portsmouth. Board of directors for three years: L. L. Barber, Toledo. Delegates to the N. D. A. for two years: L. L. Barber, H. C. Brown, J. R. Callahan, L. E. Custer. Alternates: G. H. Wilson, G. D. Edgar, Z. N. Wright, E. S. Braithwaite.

Cleveland was selected as the meeting place in December, 1917.

SUGGESTIONS

(ORIGINAL AND PRACTICAL CONTRIBUTIONS TO THIS DEPARTMENT
ARE INVITED BY THE EDITOR)

Refitting Temporary Dentures

In some cases temporary plates may be refitted by cleaning and freshening the palatal portion. Then covering with a piece of vulcanizable gutta percha which has been warmed in water of about the temperature used for modeling compound. Use this as an impression material. Chill in cold water. Trim and repeat until you have perfect adaptation. Flask and vulcanize.

—*F. A. W., Dental Review.*

Fuller Bulbs for Polishing Plates

After rubber plates are shaped up with files and carborundum wheels, and approximately finished with scrapers and sandpaper wheels, the most rapid method of removing scratches and giving the piece a highly glazed finish is by the use of a fuller bulb followed by a cotton flannel buffing wheel.

The fuller bulb is made of rubber, just the right size and shape, ready to be screwed onto the screw mandrel of your laboratory lathe, found at any plumber's shop, costs only a few cents, and will last indefinitely.

The stitched cotton wheel is great. Abrasive, equal parts of finely pulverized silex and pumice applied wet.—*J. L. Mewborn, Memphis, Tenn.*

Setting Inlays with Silicate Cement

For the past two years I have set perhaps fifty per cent. of my porcelain inlays with silicate cement. The silicate cement used for this purpose should be mixed slightly stiffer than the oxyphosphates are mixed. It must be borne in mind that the material is not adhesive and that the cavity and filling should be prepared with retentive grooves. The silicate cement is certainly less soluble than the oxyphosphate cement, and the color harmonizes so well with the tooth and inlay that it is almost ideal for this purpose. The filling of course should be kept scrupulously dry, and should be held under pressure until the cement has set, say, three minutes, when it should be varnished. In short, it should be treated in the manner prescribed for silicate fillings. Any excess around the margins of the inlay should be disked off when hard, and not broken away.

—*D. W. McLean, Dental Cosmos.*

A Military Dental Surgery

The new automobile dental surgery was inspected by the King and Queen at Buckingham Palace on October 9th. The car has been designed and built by the engineers of the Royal Automobile Club, and was presented to the War Office through the Red Cross Society. The cost (about £950) has been met by subscriptions raised by the Civil Service Federation, the officials and members of which are to be congratulated on the success of their endeavor to provide dental treatment immediately behind the firing line. Sir Frederick Treves has expressed the opinion that the dental car, which is the first of its kind to be used by the British army, would be of the utmost service in helping to keep the fighting troops fit. In general appearance and design the car resembles the type of dental car which has for several months past been in use by the French army, although, as far as can be judged from some photographic illustrations of the French car, the *voiture de stomatologie* does not appear to be designed with the swing door arrangement that gives useful extra accommodation in the British car.

—*News and Notes, The Dental Record.*

To Relieve Pain in Socket After Extraction

Dip a small piece of wool into pure chloroform and oil of clove and place in cavity; relief will be given in a few seconds.—*Oral Health.*

Hemorrhage After Extraction

In a case of severe continued bleeding where other remedies failed a plug of cotton wool dipped in adrenalin and then in tannin stopped the bleeding completely in ten minutes. It forms a pasty mass and seems to stick the gum down.—*Oral Health.*

Repairing a Fixed Bridge

The following method of repairing a fixed anterior bridge from which a tooth has been broken, with the pins left, will be found useful.

Take a suitable tooth (one with pins broken off short will do) and with a diamond-drill countersink two holes in the back of it to take pin-heads left in bridge. Attend to articulation etc., and cement to place. A neat and strong repair will result.

—S. Braddock, Sydney, N.S.W., Commonwealth Dental Review.

Systemic Infection of Dental Origin

Pyorrhea, tonsilitis, or sinus disease, may be the source of infection which is now termed rheumatism, and root abscesses and pus pockets connecting with them are often the source of either chronic or acute rheumatism, nasal sinuses, and chronic mouth and throat infections even develop anaphylaxis from constant poisoning and their results appear in melancholia, asthma, hay-fevers, herpes, urticarias, and various skin eruptions.

—A. H. Herr, M.D., Ohio State Medical Journal.

Non-Corrosive Iodin Broach

A very useful broach or carrier of iodin preparations is made by taking a strip of ordinary aluminum plate about two inches long, cutting it into strips a little wider at one end than its thickness, tapering it to a blunt point at other end, file edges rounding and insert large end into broach holder or split stick. Wrapped with a little cotton or plain, it makes a splendid instrument for carrying iodin preparations into pyorrhea pockets. Being flexible, it can be easily bent into best possible shape to reach any pockets. Wrapped with larger quantity of cotton makes a splendid swab. The iodin will not corrode the aluminum, making a cheap and useful instrument.

—P. A. Pyper, Pontiac, Ill., Dental Review.

Setting a Large Bridge in Warm Weather

One of the ordinary mistakes made with the use of the chilled glass in hot weather is that the operator forgets that the temperature of the room is around 80, 85 or 90 degrees. He omits to chill his spatula at the same time; therefore he has a warm spatula mixing the cement on a cold slab. A great deal of trouble is experienced in mixing cement in setting bridge work. The trouble about setting a big bridge with oxyphosphate is that it chills or hardens before you can get it in the mouth in hot weather. We sometimes wish it was winter time so we could set a bridge with four or five abutments; but it is easy if you will remember to chill the bridge before you put the cement in there. Put it in ice water and get it as cold as you can, then take it out and dry it with alcohol always, and then you have a cold bridge, a cold mixing slab, a cold spatula, and the consequence is your bridge will go to place because the cement cannot harden so rapidly, whereas if you make an extremely thin mix of your material, so that you can get your bridge to place, you will not get a perfect cement, and it will disintegrate rapidly.

—T. P. Hinman, Western Dental Journal.

A Good Sticky Wax

R.: Pure white beeswax, 8 oz.; pure white powdered resin, 1½ oz.; powdered gum dammar, 1½ oz.—*R. G. Donnan, Mackay, Q., Oral Health.*

Pain After Extraction

Pain and soreness will very rarely be experienced if a practice is made of introducing tincture of iodin into the sockets after all extractions.

—*W. A. Love, Commonwealth Dental Review.*

Proper Consistence of Silicate Cements

The point of proper consistence is reached when the mix has a tendency to follow the spatula when it is raised from the slab, forming coneshaped masses but remaining sticking to the slab, and when it does not settle down again into a rounded mass.

—*C. C. Voelker, Dental Cosmos.*

Counter-irritants Alone Insufficient

In cases of apical infection, the use of "Aconite and Idoin" on the gum, may promote resolution and cause the soreness of the tooth to disappear; yet such efforts are futile without the additional treatment of opening the root canal, destroying the infection and filling.

—*Dr. Bailey, Michigan Dental Journal.*

Follow the Directions

Every silicate must be mixed according to the directions from the manufacturer, as it has its eccentricities, and unless we understand its manipulation it will never meet with success in our hands. Do not condemn an article because you do not know how to work it properly. It is like an automobile—you have to learn to drive it.—*J. H. Hospers, The Dental Review.*

Real Prevention of Caries

I want to venture this statement without fear of contradiction, that if every child born could have the proper mouth toilet given by mother or nurse until it is two years of age, when the tooth-brush habit should be fairly formed, and if the principles of Oral Hygiene be followed from this time on regularly and persistently, the decay of teeth would be lessened from fifty to eighty per cent.—*B. S. Southerland, Michigan Dental Journal.*

The Selection of Cements

I would recommend, as a general proposition, that every man adopt a make of cement and become familiar with its properties and peculiarities and confine himself to the use of that one cement, because I am convinced that each brand of cement has its own peculiarities and you cannot mix one brand of cement one day and the next day mix another brand and get equal results.—*T. P. Hinman, Western Dental Journal.*

Danger in Pressure Anesthesia

The use of cocain pressure-anesthesia, without regard to the presence of infection in the pulp, must be condemned as a dangerous empiricism. The forcing of blood contaminated by bacteria and their products, into the periapical structures in the endeavor to anesthetize the pulp, results in some of the peridental difficulties which dentists and physicians alike are endeavoring to prevent. The field for cocain pressure-anesthesia is limited and its misapplication may result in a chronic focus of infection with all its attendant complications

—*Editorial, Pacific Dental Gazette.*

Gutta-Percha and Cement

In order to facilitate the removal of pivot crowns when necessary, I always line the canals with a thin layer of gutta-percha before cementing the post in position. If any trouble arises I can then warm the post and remove without difficulty.—*J. S. Storey, Ash's Monthly.*

A Renaissance in Prosthodontia

A renaissance in prosthodontia is due, and we prophecy that it will arrive and bring with it the next important progressive step in dentistry, the supplying of sane and sanitary dentures at a low cost and with a minimum ot danger to the remaining natural organs.

—*Editorial, Dental Items of Interest.*

"Cleaning Teeth" an Important Operation

We dentists, then, should not be too proud to clean teeth, and of all operations we should place this at the head of the list, and should teach our patients that the money spent in this work is the greatest bargain both in money and in health they have ever received.

—*W. S. Hewett, Western Dental Journal.*

Antidote for Novocain-Suprarenin

In this country it has been ascertained by experiments that ether is a better remedy to employ in case of collapse from over-dose of this anesthetic than anything else. In the department of experimental medicine in the University of Minnesota they gave animals an extreme dose producing convulsions, and revived them with ether. The conclusion was reached that the ether was the best antidote to use under these circumstances.

—*W. H. G. Logan, The Dental Review.*

Repairing Crown or Bridge Work

Cut off the pins flush with the backing. Drill a slot lengthwise, slightly countersinking on the lingual. Select your facing, and grind, if necessary. Cut a strip of 34 gauge 24-k. gold, as wide as the slot is long, bend over a common pin, pinch together, making a post. Coat the outside with anti-flux, spread the flat part of post slightly, and flow solder in the post to make it solid.

Place in position from the lingual, and with facing in position, burnish the flat part to fit the margins. Trim off the surplus; fill with casting wax, remove and cast.

—*Claude B. Brownell, Dental Review.*

Desensitizing the Pulp with Novocain

Novocain having, as has been noted, an affinity for nerve tissue, we can act on the peridental membrane and so desensitize a pulp by placing our solution in close proximity to the apex of the roots. To do this, a No. ½ round bur is used to perforate the external alveolar plate and a short, blunt needle inserted, the tissus at site of puncture having received a drop from a sharp needle previously. In detail, our procedure is this: Locate the area, in the lowers one-third way rootwards from the gingival, paint with iodin, inject one drop with a sharp needle, tense the tissues by applying the index finger at right angle to the long axis of the teeth, and so pressing all removable tissue rootwards. (This is important, as on removal of the finger after the injection the hole in the process will not remain in opposition with the hole in the overlying tissue, so infection is prevented.) Next perforate the thin outer plate with a ½ round bur, which will drop into seeming space suddenly, when cancellous bone is reached, the outer plate only being pierced. Insert the short, blunt needle, and very, very, very slowly inject five to ten drops of a ½% solution. We are practically injecting into the general circulation, so proceed slowly, using the minimum amount of weak solution. Operate in three to five minutes. Pulps may be removed or cavities prepared, etc.—*H. J. Merkeley, Oral Health.*

NEW PUBLICATIONS

Crown and Bridge Work. By Frederick A. Peeso, D.D.S., Director of the Dental Graduate School of the University of Pennsylvania. Octavo, 456 pages, with 752 Engravings. Cloth, $5.00, net. Lea Febiger, Publishers, Philadelphia and New York, 1916.

The technic of Crown and Bridge Work has assumed far more importance since dentists and physicians have realized the close relation of oral cleanliness with the patient's physical well-being. The aim of the present work is to secure a full measure of stability with promise of long service, and at the same time to enforce the most exacting care in all preparatory procedures to secure a healthy condition of the supports and abutments, to facilitate cleanliness and to procure asceptic, durable and efficient results.

"Preparedness" might be termed the keynote of the book. While the technic of the modeling and fitting of the appliance is given more fully and clearly than in any other work, there is an insistent emphasis throughout on the fundamental need of the most exacting preparation of the mouth and teeth, prior to the attachment of the appliance. The student who masters this preliminary method, and insures the control of any subsequent developing sepsis by the use of the movable appliance—with which Dr. Peeso's name is inseparably associated—will have acquired not only the simplest, most durable and efficient, but the *safest* technic known to modern crown and bridge science.

Mouth Hygiene. A Course of Instruction for Dental Hygienists. A Text-Book Containing the Fundamentals for Prophylactic Operation. Compiled by Alfred C. Fones, D.D.S., Bridge, port, Conn. Edited by Edward C. Kirk, Sc.D., D.D.S., LL.D.; Robert H. W. Strang M.D., D.D.S., and Alfred C. Fones, D.D.S. Octavo, 530 pages, with 278 Engravings and 7 Plates. Cloth, $5.00, net. Lea & Febiger, Publishers, Philadelphia and New York, 1916.

The increasing importance of *mouth hygiene* in its relation to preventive dentistry and to good health, and the growing demand for specially and thoroughly trained *dental hygienists* who shall be competent to render scientific and proficient service in dental offices and infirmaries, in public schools and other institutions, are coming to be almost universally recognized not only by the medical and dental professions, but also by the laity.

In the fall of 1913, the contributors to this work were approached by Dr. Fones and asked if they would aid in such a cause by delivering lectures to a class of young women in Bridgeport, Conn. Without exception they agreed, the lectures were delivered, and now, after careful correction and condensation, they are given permanence and publicity in book form.

It is the earnest desire of editor and contributors that educational institutions will take up this work and establish a course of education and training for women as dental hygienists. When the value of a service such as they might render is fully appreciated, there will be a great demand for these practical workers for mouth hygiene, not only in private offices, but in public schools.

Dentists and physicians will do well to place a copy of this book in the hands of their office assistants, and every medical inspector of schools should possess a copy. It is a most important book and its influence for good should be far-reaching.

Oral Abscesses. By Kurt H. Thoma, D.M.D., Lecturer on Oral Hygiene and Pathology, and member of the Research Department of Harvard University Dental School; Instructor in Dental Anatomy, Harvard Medical School; Oral Surgeon to the R. B. Brigham Hospital; Visiting Dental Surgeon to the Long Island Hospital; Consulting Oral Surgeon to the Boston Dispensary. Boston, Ritter & Company Publishers, 1916.

The author states that this volume has been written with a view to establishing a correct relationship between the condition of the oral cavity and the health of the patient, and also in the hope that a clear presentation may lead to a more general understanding of this new field.

The important discovery that septic lesions in the mouth may be foci or primary causes of many acute or chronic diseases of systemic nature, has brought about great changes in the relationship between dentistry and medicine, and the physician, as well as the dentist, will find this book of interest.

The book aims to give a clear understanding of the pathology, treatment, and prevention of oral lesions, and to familiarize the student with the recognition and nature of certain infectious diseases which may be caused by them.

The subject matter is treated under the following heads: The Phenomena of Infection; History and Classification of Oral Abscesses; Pathological Development and Diagnosis of Alveolar Abscesses, Caused by Diseases of the Dental Pulp; Abscesses from Other Causes; Pathological Development and Diagnosis of Abscesses of the Tongue and Salivary Glands and Ducts; Bacteriology of Oral Abscesses; Histological Pathology; Secondary Complications; Examination of the Oral Cavity; Treatment of Oral Abscesses; Prevention; The True Value of a Tooth.

The book contains 213 pages, is concisely written and profusely illustrated.

Health and Longevity Through Rational Diet. Practical hints in regard to food and the usefulness or harmful effects of the various articles of diet. By Arnold Lorand, M.D., Carlsbad, Philadelphia, F. A. Davis Company, Publishers, 1916. Price, net, $2.50.

The author of this book states that it is a surprising fact that even scholars well versed in a great variety of subjects often display the veriest ignorance or show the greatest carelessness precisely in respect to what, and the manner in which they eat. Others, again, fall into the opposite error—those for example, who studiously avoid all foods containing even a trace of uric-acid-forming constituents, lest an excess of such substances prove injurious, and meanwhile overlook the fact that in addition to such uric-acid producing components, these foods contain many other important substances, such as certain nutritive salts, an insignificant intake of which may result in serious injury, particularly in the period of growth and development of the body.

Because over-eating may prove harmful, many persons restrict their diet to such an extent as to do their bodies more harm than they would by eating to excess.

And again, the diet should vary according to the nature of the occupation and the functions to be carried out, just as has been the custom in the case of domestic animals.

Few persons know what they really should or should not eat, and it is the object of this book to convey all information possible regarding the influence of various food substances upon the organism and the beneficial and detrimental effects derived from them under certain conditions. The author treats the subject in ten chapters under the following headings: The Influence of Food Upon Man; The Fundamental Laws of Rational Feeding; The Injurious Modes of Feeding; The Good and Evil Effects of Various Food Substances; Vegetarianism and Its Advantages and Disadvantages; The Practical Advantages of Rational Feeding; Useful Hints; Hints for Those Obliged to Take Their Meals in Restaurants; The Increased Activity of Certain Functions Brought About by Food; The Increased Muscular Power Resulting from a Suitable Diet; The Relationship of Food to Old Age and Longevity.

The book contains 416 pages and is one from which everyone can obtain much valuable information regarding rational living and is of special importance to those leading sedentary lives.

Who's Who in Dentistry. Biographical Sketches of prominent dentists in the United States and Canada. Edited by Samuel Greif, A B., D.D S. New York, Published by Who's Who Publishing Company, 1916.

In the preface the author states, "There are many men of mark and distinction in the dental profession. This book is the first attempt at telling who they are and where they are."

Upon examination of the pages in this first edition we find the names of less than three hundred of the forty-five thousand dentists in the United States, and several thousand of the Dominion.

At this writing we can think of many prominent dentists whose names are not included in this first edition, but this may have been due to these dentists not responding to the editor's request for data. At any rate, the book as yet is far from complete. Future editions, which are to be issued triannually, may come nearer to fulfilling the intentions of editor and publishers.

SOCIETY·ANNOUNCEMENTS

Annual Clinic of the Chicago Dental Society

The annual clinic of the Chicago Dental Society will be held at the Hotel La Salle, January 26-27, 1916.

Extensive preparations are being made to make this one of the best clinics ever held by the society.

Papers of the highest type, clinics demonstrating the very latest and best in modern dentistry, exhibits of the newest appliances by firms from all over the United States, and a banquet that will be a pleasure long to be remembered are but a part of the features of this meeting.

Dr. Joseph Bloodgood, of Baltimore, will present the paper at the meeting on Friday evening and at the banquet on Saturday evening. Dr. Vincent, of Minneapolis, will be the first speaker after which the meeting will take the form of a testimonial for Dr. Edmund Noyes.

Headquarters, Hotel La Salle.

PERCY B. D. IDLER, *Secy.*
30 N. Michigan Ave., Chicago.

GEORGE C. POUNDSTONE,
President.

Kentucky State

The next annual meeting of the Kentucky State Dental Association will be held at Louisville, the three days previous to the Kentucky Derby—May 9, 10, 11, 1917. Address all correspondence to Dr. W. M. Randall, Louisville, Ky.

W. M. RANDALL, *Secy.*

A Four-State Post-Graduate Meeting

The states of Alabama, Mississippi, Texas and Louisiana will hold a joint post-graduate meeting next year, June 4,5,6,7, in New Orleans. This will be immediately followed by a special Detailed Technical Course, negotiations for which are being made with some of the most talented clinicians throughout the country.

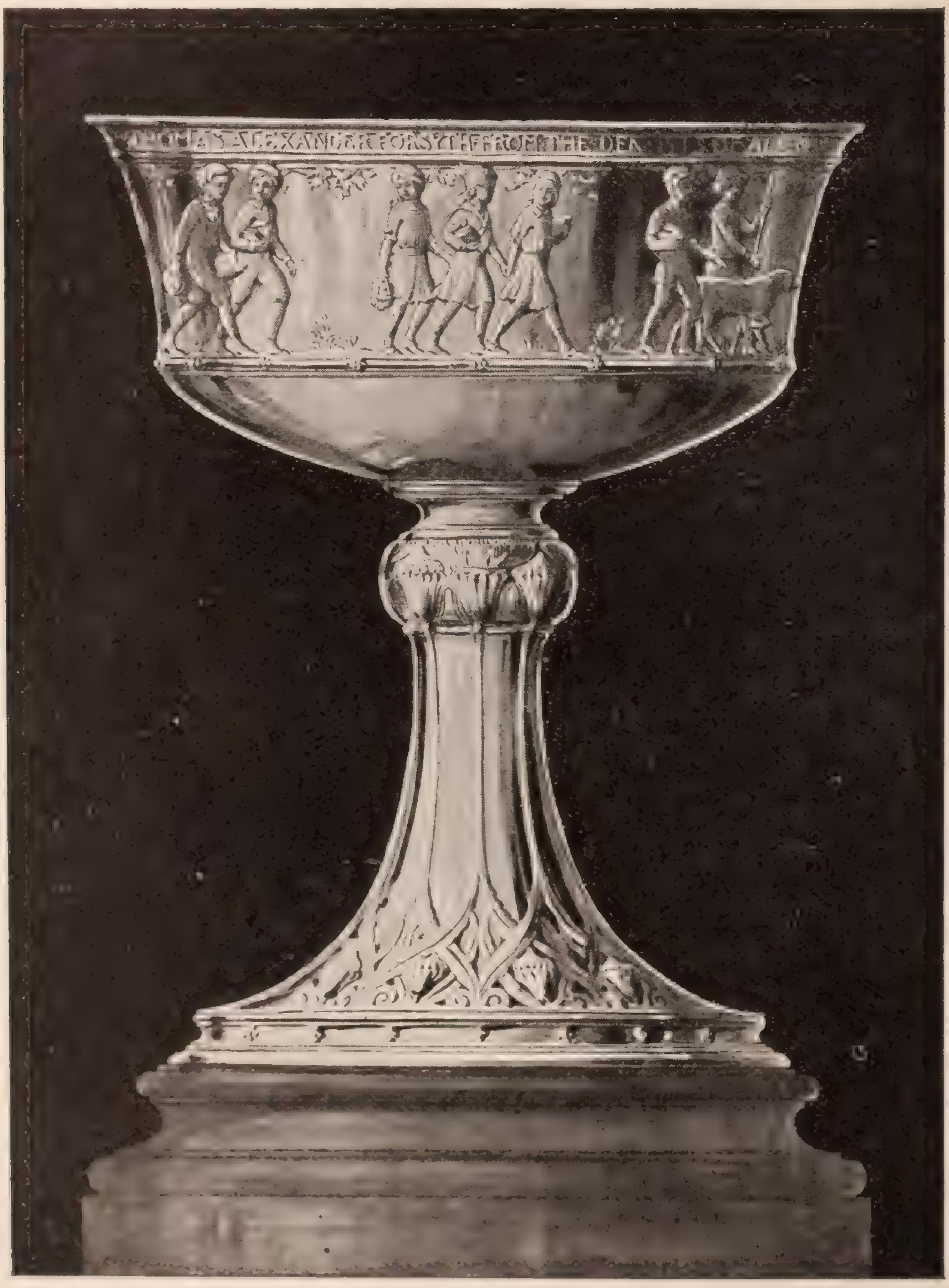
In order to encourage attendance from other states, the committee has concluded to start a campaign of wide publicity, and from time to time will issue detailed announcements of the progress being attained.

E. B. DUCASSE, *Chairman Publicity Committee.*

The Forsyth Banquet

Gentlemen of the Dental Profession: You are cordially invited to participate in the presentation by the dental profession of a loving cup to Mr. Thomas Forsyth, at a banquet on Saturday, January 20, 1917, at half after six o'clock, at the Hotel Somerset, Boston.

Presiding officer will be L. L. Barber, D.D.S., Toledo, Ohio, President of the National; toastmaster, W. H. G. Logan, M.D., D.D.S., Chicago, Ill., president-elect of the National; presentation of the cup by H. E. Friesell, B.S., D.D.S., Pittsburgh, Pa., Dean of the University of Pittsburgh, Dental Department.



Tickets for this banquet (subscription $5.00) can be obtained from any member of the committee. Checks should be made payable to Dr. Charles J. Smith, 35 Butler Exchange, Providence, R. I.

Banquet Committee on Publicity:

Frederick A. Keyes, D.M.D. Percy R. Howe, D.M.D.

L. S. Belyea, D.M.D.

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXVII FEBRUARY, 1917 No. 2

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The Ohio State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

Editorial Office: 195 16th Avenue, Columbus, Ohio
L. P. Bethel, M.D., D.D.S., Editor-in-Chief

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REGULAR CONTRIBUTIONS

ORAL HYGIENE—ITS RELATION TO ANESTHESIA, ANALGESIA AND THE ANESTHETIST*

BY BION R. EAST, D.D.S., DETROIT, MICH.

(FROM THE DENTAL DEPARTMENT, DETROIT BOARD OF HEALTH, IN CONJUNCTION WITH THE RESEARCH LABORATORIES OF PARKE, DAVIS & COMPANY)

ORAL HYGIENE may be defined as the science of keeping the mouth healthy. In this paper the writer proposes to define Oral Hygiene as any agent which may be used to prevent that condition which may arise either locally or systemically, which is the result of improper care of the mouth and teeth, either by the patient himself or due to improper, unskillful or criminally careless dental operations.

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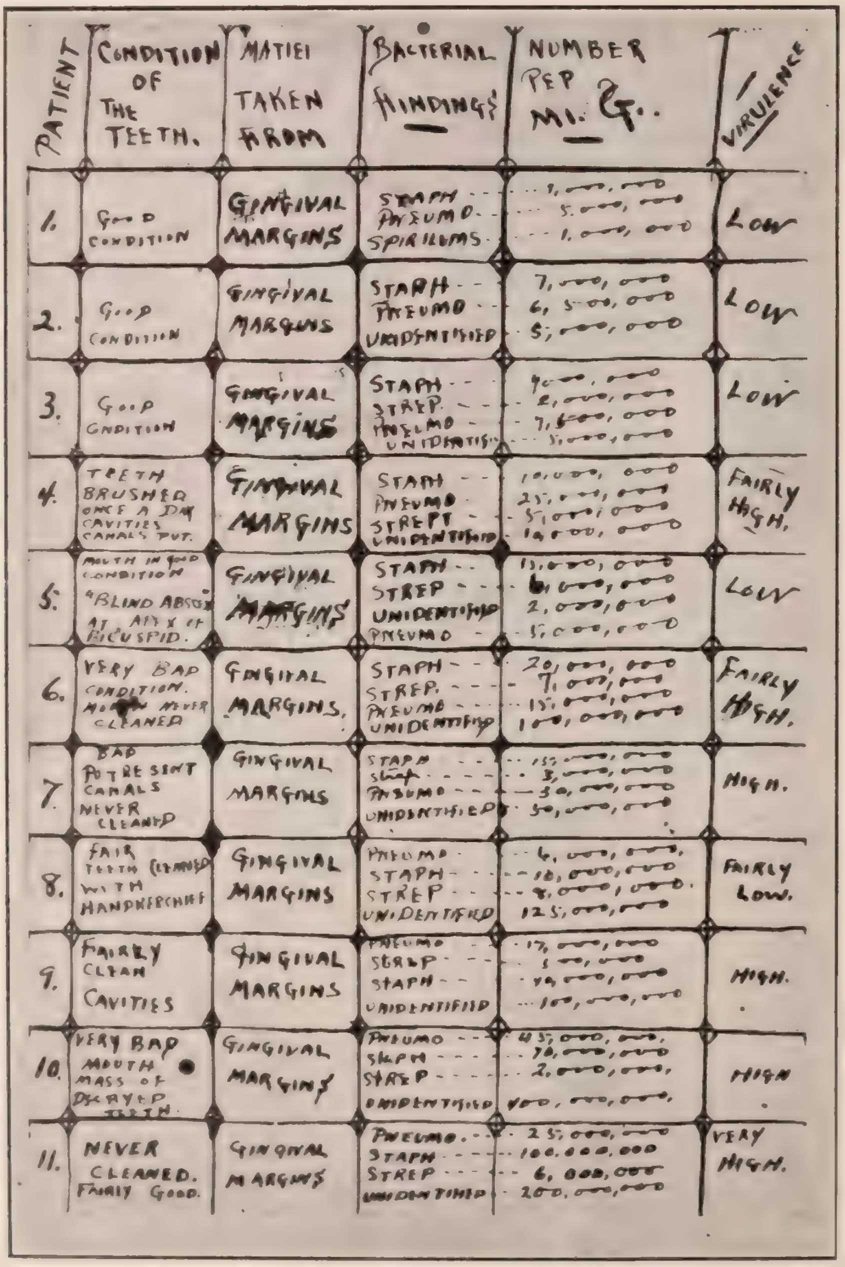
*Read before the joint meeting of the Interstate Association of Anesthetists and the National Dental Association, at Louisville, Ky., July, 1916.

At the outset the author wishes to impress upon the members of this association that he claims no originality in any statement he may make in this paper other than that of the report of the cases presented. He simply wishes to impress upon the members of this association the importance of mouth hygiene and to show a few cases which have resulted from lack of hygienic conditions in the oral cavity. The author is going to assume that any condition which has, or may develop into, detrimental effects upon the whole body economy would lower the desirability of anesthetizing an individual. Any condition which lowers the body resistance in general, certainly has a harmful effect upon a patient's toleration of an anesthetic or analgesic. A search of medical and dental literature discloses an absolute lack of thought along the subject of this paper, therefore the author wishes this essay to serve simply as an introduction to what surely will prove to be an interesting field of investigation. I wish first to call your attention to a series



PATIENT	CONDITION OF THE TEETH.	MATIEI TAKEN FROM	BACTERIAL FINDINGS	NUMBER PER MI. G.	VIRULENCE
1.	GOOD CONDITION	GINGIVAL MARGINS	STAPH PNEUMO. SPIRILLUMS	9,000,000 5,000,000 1,000,000	LOW
2.	GOOD CONDITION	GINGIVAL MARGINS	STAPH PNEUMO UNIDENTIFIED	7,000,000 6,500,000 5,000,000	LOW
3.	GOOD CONDITION	GINGIVAL MARGINS	STAPH STREP. PNEUMO UNIDENTIFIED	40,000,000 2,000,000 7,500,000 5,000,000	LOW
4.	TEETH BRUSHED ONCE A DAY CAVITIES CANALS PUT.	GINGIVAL MARGINS	STAPH PNEUMO STREPT UNIDENTIFIED	10,000,000 25,000,000 5,000,000 14,000,000	FAIRLY HIGH.
5.	MOUTH IN GOOD CONDITION "BLIND ABSCESS AT APEX OF BICUSPID.	GINGIVAL MARGINS	STAPH STREP UNIDENTIFIED PNEUMO	13,000,000 6,000,000 2,000,000 5,000,000	LOW
6.	VERY BAD CONDITION. MOUTH NEVER CLEANED	GINGIVAL MARGINS.	STAPH STREP. PNEUMO UNIDENTIFIED	20,000,000 7,000,000 15,000,000 100,000,000	FAIRLY HIGH.
7.	BAD PUTRESCENT CANALS NEVER CLEANED	GINGIVAL MARGINS	STAPH STREP PNEUMO UNIDENTIFIED	15,000,000 3,000,000 30,000,000 50,000,000	HIGH.
8.	FAIR TEETH CLEANED WITH HANDKERCHIEF	GINGIVAL MARGINS	PNEUMO STAPH STREP UNIDENTIFIED	6,000,000 10,000,000 8,000,000 125,000,000	FAIRLY LOW.
9.	FAIRLY CLEAN CAVITIES	GINGIVAL MARGINS	PNEUMO STREP STAPH UNIDENTIFIED	17,000,000 1,000,000 49,000,000 100,000,000	HIGH.
10.	VERY BAD MOUTH MASS OF DECAYED TEETH.	GINGIVAL MARGINS	PNEUMO STAPH STREP UNIDENTIFIED	45,000,000 70,000,000 2,000,000 400,000,000	HIGH
11.	NEVER CLEANED. FAIRLY GOOD.	GINGIVAL MARGINS	PNEUMO. STAPH STREP UNIDENTIFIED	25,000,000 100,000,000 6,000,000 200,000,000	VERY HIGH.

Fig. 1

of tests which were made to re-confirm the fact that in a mouth receiving very little hygienic attention, one in which caries of the teeth are prevalent or other pathological conditions present, that bacteria were more prevalent and of greater virulency. (Fig. 1.) An examination of these charts show the bacteria much more virulent where no care is given the mouth. The great number of pneumococci present is of the greatest interest to the anesthetists. In Case No. 10, 45,000,000 pneumococci to the milligram were found present, of very high virulence; if for any reason this patient should be given a general anesthetic, he surely would be a very favorable subject to develop post-operative pneumonia, if the patient should inhale saliva containing such virulent bacteria in such numbers, as are present in his oral cavity. The combination effect of shock which certainly follows the combination of general anesthesia and the major operation which made it necessary to give a general anesthetic, lowers the resistance of the body. Understand that I do not say the shock which follows a general anesthetic alone. Crile has demonstrated that the resistance is increased where nitrous oxid and oxygen is used as an anesthetic, and the operation performed carefully in combination with local anesthesia, but many operations are not done carefully, many are of such a nature and magnitude that the patient must suffer shock and the body resistance lowered. I think you will agree that if the patient inhaled a saliva such as subject No. 10 is the possessor of, he might develop pneumonia, and the anesthetists or the agent used to anesthetize the patient, receive full blame. It would be strange if it did not occur.

I am sure that if a careful examination of the mouths of patients who have contracted post-operative pneumonia were made, a high percentage of them would be found to have unhygienic conditions present, due to caries, pyorrhea, etc., and that proper attention to overcome these conditions before the anesthetic was given would have eliminated the dreaded pneumonia. Members of this association who have the opportunity to follow such cases in hospitals would find an interesting field of observation and confirm what many think to be true. It has only been within the last year or so that the average physician could see anything in the mouth other than a tongue, when he made an oral examination. He considered the mouth simply as a convenient aperture through which he could examine the pharynx. The teeth and gums seemed to have been considered as something entirely distinct from the whole body economy. The physicians and dentists must have labored under the impression that the teeth were created for the sole purpose of providing a suitable object upon which the dentist could exhibit, at times, his none too skillful workmanship.

Pyorrhea alveolaris was dismissed as an inconvenient but harmless disease, which was only cured by wholesale extraction. Pulps were destroyed and removed from teeth, and root canals allowed to go unfilled. Abscessed teeth were treated and supposed to be cured, but almost universal use of the dental radiograph has proven that many teeth, though comfortable, have rarefied areas at their apices.

Billings, Hartzell, Harris and others, have proven that the infection here is the original cause of many systemic conditions, and when this focus was removed the systemic condition was relieved. Conditions such as these must react upon the patient when anesthetized. I am glad to state that conditions are rapidly changing, root-canal filling and treatment is being undertaken seriously. Pyorrhea alveolaris is being treated and cured by skillful manipulation in conjunction with proper medical agents, of which emetin does not seem to be one. Unsanitary bridgework is being removed and is being replaced by removable, hygienic substitutes.

I wish to exhibit a few cases showing the result of mouth infection and their primary cause:

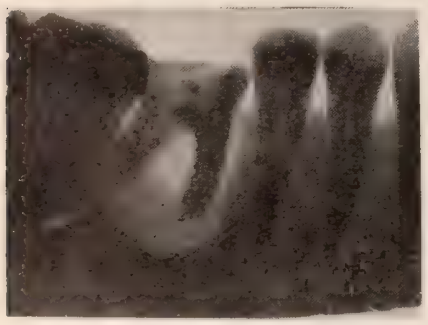


Fig. 2

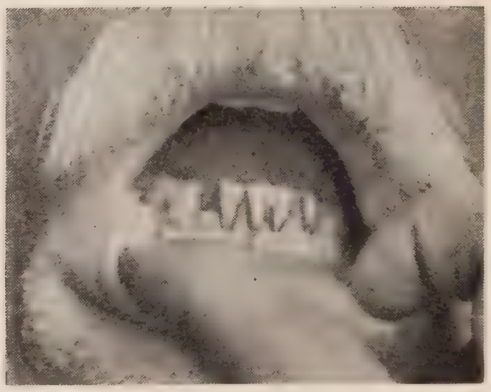


Fig. 3

Figure 2. The pulp has been destroyed in this lower molar, but the root canals are unfilled. Infection has destroyed the peridental membrane and alveolar process. The patient suffered no little pain and the permanent loss of the tooth. This is the result of improper root-canal treatment on the part of the dentist.

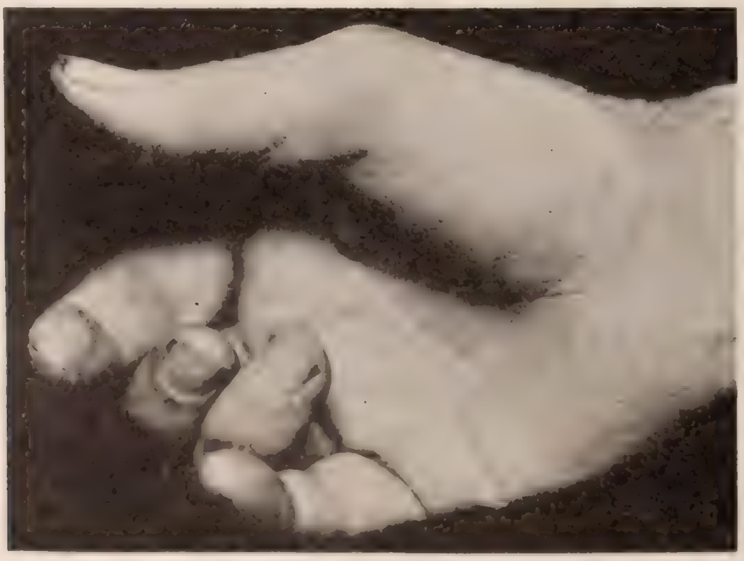


Fig. 4

Figure 3. Shows a case of pyorrhea referred to the Board of Health clinic by one of Detroit's hospital polyclinics, suffering with arthritis. Male, age 60, unable to dress or feed himself; unable to work.

Figure 4. Shows the degree he could close his hand at the beginning of treatment, which consisted of a thorough scaling of the teeth, the administration of a proper dosage of vaccine and attention given to the elimination of waste products in the intestines. After four weeks he could close his hand, as in Fig. 5. The patient then resumed his work and was quite normal in every way.

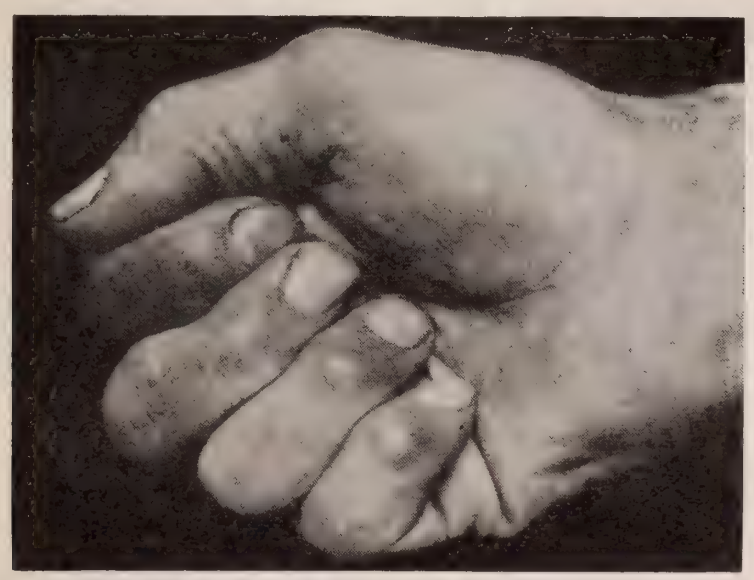


Fig. 5

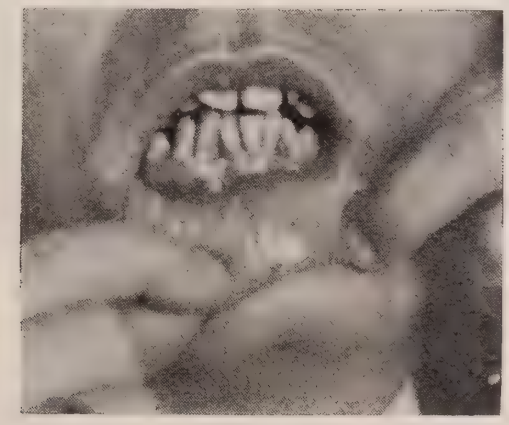


Fig. 6

Figure 6. A case from the dental department Detroit Board of Health; diagnosis, pyorrhea, infection primary streptococci pyogenes, very virulent, but no rheumatism. Digestion very bad.

Treatment—Very thorough local treatment combined with emetin hypodermically and in tablet form. Before the emetin injections into the pockets, the recession shown was not present, but appeared twenty-four hours after the injection. Was it caused by emetin? Radiographs showed attachment of the laterals gone, and they were extracted. The emetin treatment was now discontinued. After the emetin was entirely eliminated from the system, the teeth were scaled, and vaccines used. His digestive apparatus returned to normal, pus ceased, and he is now on the road to recovery.

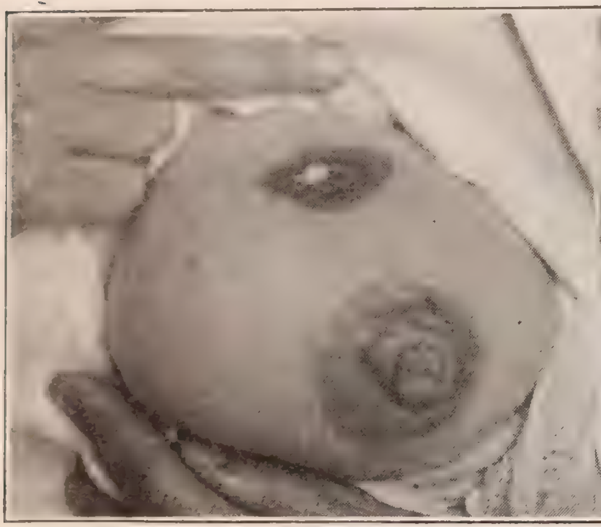


Fig. 7

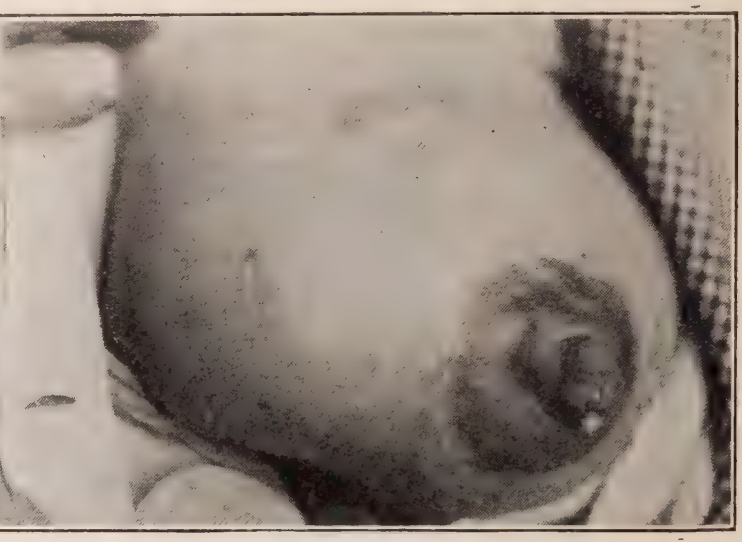


Fig. 8

Figure 7. Ulcer on the breast which defied treatment for two years. This ulcer disappeared two weeks after the mouth infections were eliminated. Elimination consisted of simply extracting all diseased teeth, and the curett-

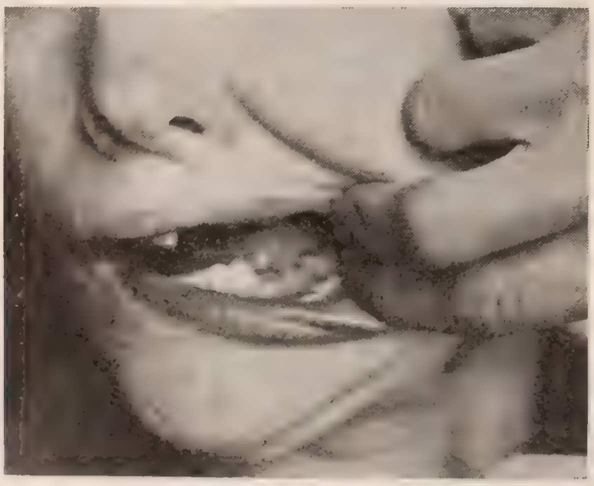


Fig. 9

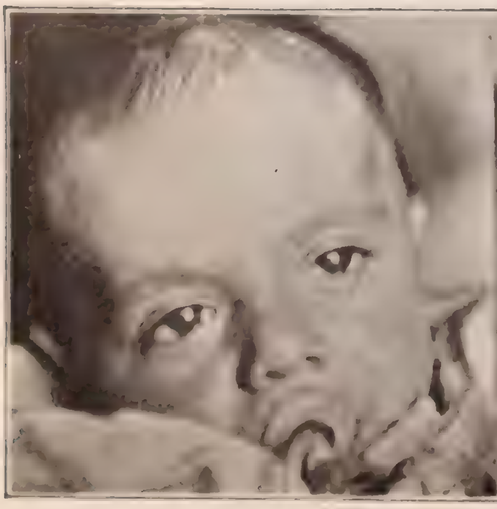


Fig. 10

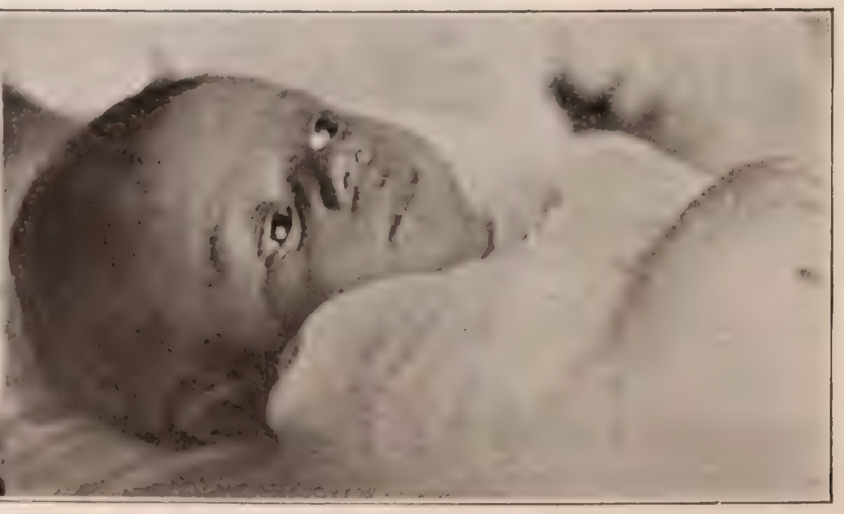


Fig. 11

ment of their sockets. Fig. 8 shows the abscess healed. Fig. 9 shows the condition of the mouth before treatment. Fig. 10, baby at the time the mouth infections were broken up. Fig. 11, one week later. Fig. 12, six weeks later.

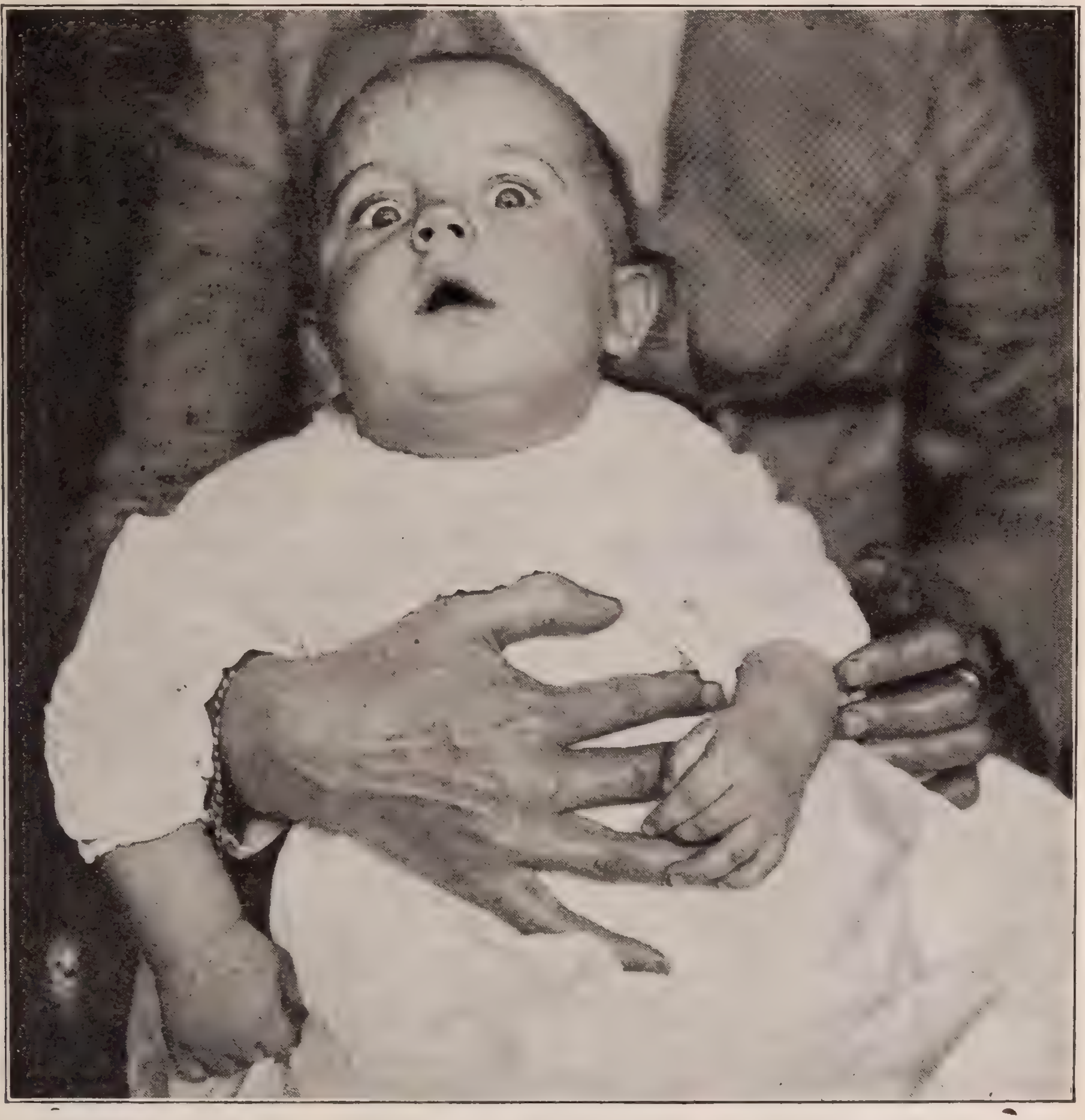


Fig. 12

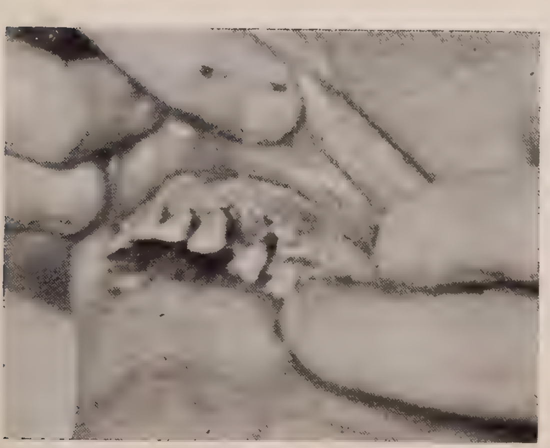


Fig. 13

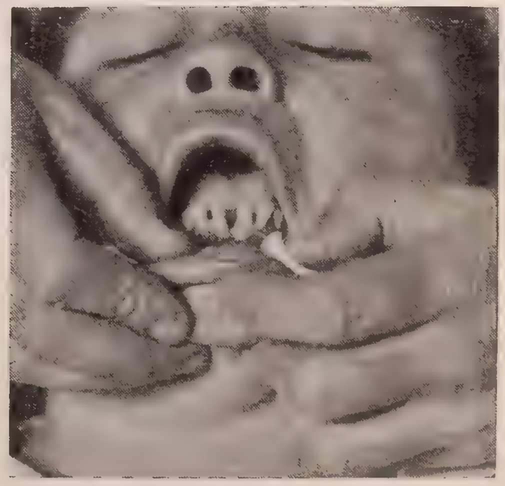


Fig. 14

Figure 13. Rheumatic; unable to turn head. Diagnosis, pyorrhea. Referred by Harper Hospital. Temperature, 101. Treatment: Scaling

carefully and slowly done to avoid allowing the absorption of too much toxin at once. Vaccine given every five days. Results: Normal temperature in one week. Last traces of rheumatism gone in 28 days, and no return in seven months.

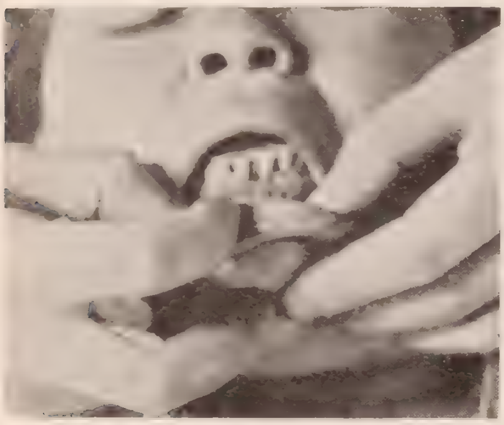


Fig. 15

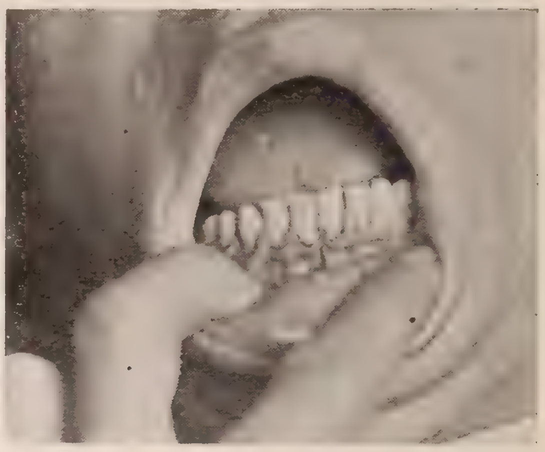


Fig. 16

Figure 14. Rheumatic, gums very painful, under treatment one month. Fig. 15 taken four days after Fig. 14. Joints badly swollen. The teeth very painful and resisted the usual treatment given in such cases, including vaccines. A filtered virus was then made from the pus, and an animal immunized against the virus. The complement was then obtained, diluted 1 to 1000 and combined with normal serum. This was placed in all the pus pockets. At the same time, large doses of vaccine were used. A response came in one week. Two weeks, and all soreness left. Case still under treatment.

Figure 16. Tubercular patient. Tubercle bacilli found in the pockets in large numbers. Local treatment only, with complement injected in the pus sockets was used. Cessation of the flow of pus, resulting from the treatment.

What is to be learned from these cases? First, that unhygienic conditions in the mouth have a very marked systemic effect. Second, that this may affect parts quite remote from the accepted locations. Third, we can infer that any conditions as potent as some mouth infections will be detrimental to anesthesia.

But what relation can oral hygiene bear to the anesthetist? First, any agent which reacts upon the patient harmfully must indirectly affect the anesthetist and his work. Second, anesthetists, being no more immune to pathological conditions in the mouth than any other human, may at the present time, and probably are absorbing toxins, and lowering their body resistance.

Let everyone who suspects improperly-filled root canals, or ill-fitting bridgework in his or her mouth, have radiographs made; and if pathological conditions are found, have them removed before it is necessary to become the victim of a brother anesthetist.

1241-7 David Whitney Bldg.

MODERN METHODS OF ROOT-CANAL TREATMENT AND FILLING*

BY EDGAR D. COOLIDGE, D.D.S., CHICAGO, ILL.

THE RESPONSIBILITY of the dental profession to the public has been increased greatly by the investigation of the past few years on the relation of foci of infection to systemic disease. In the chairman's address before the section of stomatology of the American Medical Association, at Detroit, in June, 1916, Dr. Moorehead stated that of 498 cases of chronic arthritis at the Presbyterian Hospital of Chicago, in Dr. Frank Billings' service, the radiographic mouth examinations show evidence of chronic alveolar abscess "ranging from small areas of rarefaction to gross bone lesions" in 89 per cent. Another group of patients with other systemic disorders, excluding arthritis, show chronic alveolar abscess in 74 per cent. A third group of patients from private practice show a record of 69 per cent. of chronic alveolar abscess. Most of the teeth showing alveolar abscess show root-canal operations had been performed in the past. With such a significant record kept constantly before us as a mental picture, we must surely awaken to the seriousness of this situation and ask ourselves what about the work we are doing daily in our offices? Will it stand the test of time with more impunity than the work of the past? If not, it were better for humanity that all non-vital teeth should be extracted. This, while perhaps a sure way of avoiding future chronic abscess, is not consistent with the best judgment, because very few *well-filled* roots of teeth show alveolar abscess. The distressing thing is that so few can be called well filled which have been filled in the past. Root-canal work has not received the attention in the past that its importance demands, but since the investigations of recent years have turned the *searchlight* upon this field and revealed the awful picture of the results of imperfect work and faulty technic, we must place it in the front rank and make use of *every* available aid to accomplish more perfect results.

IMPORTANCE OF CORRECT DIAGNOSIS

It is needless to say that in the light of our present knowledge, every available effort should be made to preserve the *vitality* of the pulp, and such service is of the greatest value. However, we meet with demands for crown and bridgework where pulp removal is desired, *but should not be undertaken* if the radiograph shows a crooked root which cannot be properly cleaned and filled. In such cases other methods of attachment should be resorted to.

Another problem in diagnosis enters where non-vital teeth are to be considered. With an average of 80 per cent. of imperfectly-filled roots having chronic abscesses and rarefactions existing at their apices, and many other imperfectly-filled roots without visible evidence of chronic alveolar abscess, it is an *exceptional root* which does *not* require re-treating and re-filling, Some of these teeth should be extracted; others may be treated and *re-filled.* followed by root resections and curettment. There are also some rarefied areas about root ends which may be corrected by treatment and re-filling, but such cases should be examined by radiograph at intervals of several months after the treatment has been completed to see if repair has removed the rarefied area.

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*Read before the Odontological Society of Western Pennsylvania, October, 1916.

One of the greatest problems in this field of work is the proper diagnosis and determination of the method of treatment. We have found many difficulties entering to confuse the correct interpretation ot radiographs. It is a difficult matter to get a good radiographic record of a rarefied area lying beneath a thick outer plate of bone surrounded by soft cancellous bone, which scarcely casts a shadow any more dense than the outer plate alone which may lie directly over the area. It is also difficult to get radiographs which show all canals to the apical foramen in teeth having more than one canal. These problems are met with daily and must be mastered to successfully handle such cases. I regret to say that there are many evidences of oversights and mistakes in reading these difficult radiographs made by both dentists and physicians, and yet the importance of the service rendered by the radiograph to both the dentist and the public is so great that the radiographic equipment is one of the *most essential* parts of modern dental furnishings.

ASEPSIS IN CANAL OPERATIONS

Modern methods of treating and filling root canals include many aseptic precautions not even dreamed of in the past. It is impossible to place too great emphasis upon this subject. The methods of sterilization must be practical, and yet the operator must conform to necessary inconvenience and devote enough time to afford safety to his patient. Who of you would be willing to submit *yourself now* to the methods of handling root canals you have seen in the past?—No rubber dam, broaches not even cleaned, cotton from a receptacle where dust had settled for days, cotton rolled on broaches with unsterile fingers. Let us devote the care in cleansing our hands before the operation as does the surgeon before he operates. Let us wear rubber gloves, or take any other practical precaution, *or* let us avoid touching with our fingers the sterile dressings and materials which are to enter the root canal. Let us isolate our field of operation and use equal precautions as does the surgeon before he operates upon that region of the body he has before him.

The instruments for root-canal work should be kept by themselves, away from all other instruments. They should be sterilized as far as possible by boiling, which necessitates having metal broach handles. All broaches should be thoroughly cleaned and placed in a lysol solution, while cotton pellets, dressings, canal absorbent points, gutta-percha points, and *all* material which cannot be sterilized by boiling should be placed in a dry-air sterilizer. The articles used in each operation should be transferred from the sterilizers to the special cabinet where they may be kept sterile by means of formaldehyde. When the rubber has been adjusted to the tooth for operation, the field should be carefully scrubbed with alcohol and then painted with iodin, the instruments taken from the formaldehyde cabinet, the hands thoroughly cleaned, and then, and not until then, the operation begun.

TECHNIC OF CLEANING AND ENLARGING ROOT CANALS

The first requirement to good results in root-canal filling is to obtain sufficient access to the canal openings that they can be seen by reflected light *easily*, and that they may be entered *without working around a prominence* of tooth structure. The canals that are small and difficult to enter usually are curved as well; the root does not pass in a straight line parallel to the long axis of the tooth. These canals are the buccal canals of upper molars and mesial canals of lower molars, upper first bicuspid canals and often lower central, lateral and cuspid canals. It is often possible to eliminate at least one curve by a generous cutting into the mesio-buccal cusp and mesial marginal ridge of molars, a generous cutting bucco-lingually in bicuspids. When the importance of this first step to get the desired result has been impressed upon the mind of every operator, there will be more than 100 per cent. improvement in the following work.

The difficulties encountered in opening canals are so great that one's patience is often exercised to full capacity; so every detail that affords any advantage should be carried out. In extending the walls of the pulp chamber it is best to preserve the natural contour of the subpulpal wall, which usually leads toward the mouth of each canal.

The operating tray before us should contain every instrument to be used, and this means everything available for this work that will insure more perfect results. A number of small porcelain trays can be used to contain the short broaches and one may also be used for phenol and another for alcohol, so that each time a broach is used it can be passed into phenol, then into alcohol. This detail is a very safe precaution.

Selecting the smallest (XXX fine) smooth broach, it should be carefully worked to the end of the canal. This may be difficult, but it is very important as it gives one the direction and length of the canal. If a broach is used which will not pass to the end of the root, it will bind and pack the pulp and debris farther into the canal, or else it may refuse to follow the canal and make a detour into the dentin, which seldom leads back into the canal again. If a broach is first selected which will pass to the foramen and the canal enlarged throughout its entire length with the aid of 30 per cent. sulphuric acid, until the next size broach can be used in the same way, much difficulty will be avoided, and more perfectly-filled canals will be the result.

It is a progressive performance of this same technic, using always a broach which will pass to the foramen, until the canal is enlarged sufficiently to fill.

I find the Kerr pulp-canal file to be one of the most useful of canal instruments. All broaches should be used without turning them around and around in a canal. They can not follow a curved canal and be turned without breaking, so should be made to cut by drawing them back and forth like a file. It requires several hours of time spent at several appointments with a patient to clean and enlarge a small canal until it is ready to fill. Ward's sodium and potassium is sometimes very helpful in dissolving out pulp stones and calcified material, but it is dangerous to use in canals which are open to the foramen. It is an exceedingly strong caustic, and should any pass through the foramen, much harm will result. Whenever sodium and potassium is used it should be carefully neutralized with sulphuric acid and then the canal washed with sodium carbonate solution.

RADIOGRAPHY

The first time the radiograph is needed is before devitalizing to determine whether it is possible to fill the root. If the privilege were always given us of choosing the teeth to be treated, much difficulty would be avoided. However, we are more often called upon to remove old fillings and treat diseased pulps than we are to remove healthy ones. Frequently a radiograph at the beginning will avoid difficulty and embarrassment. A tooth having had previous treatment will often have a piece of broach lodged in the canal, and it is always better to locate such obstructions before beginning an operation.

The next time the radiograph is of great value is when an obstruction of any kind is met with which prevents the broach from passing beyond a certain point. It may be that the broach is headed in the wrong direction, that it has failed to make a turn, and often a radiograph of a tooth with a pin in the canal will aid the operator in passing around the curve and put him on the right track again. Growing impatient and using a drill or twist broach in such cases usually increases the difficulty and lessens the possibility of getting to the foramen.

When the canal has been cleaned and enlarged it is always well to radiograph it to prove up the work and to get the measure of the length of the root as an aid in filling. The measurement wires should always be cut to extend to the full length of the crown and root, so that when the radiograph is finished the wire may be placed upon it, to compare the length of the shadow and the pin to ascertain the amount of distortion of the picture. This point is of more use to the operator than can be impressed by the simple statement. The measurement wires should be placed in safety for future reference while filling the canal. It is difficult to pass a broach into a canal as far as the foramen every time and no farther, so it is well to bend a broach to the exact length of the canal to serve as a guide.

It is needless to say that the radiograph is necessary at the completion of the canal filling, for it then becomes a matter of record to be preserved.

Yet every operator will find occasionally that he has failed to completely fill a canal, when a re-filling becomes necessary.

FILLING THE CANAL

Now we are put to the final test, and one upon which depends to a very large extent the future health of the apical tissue. If our operation up to this point has been performed with carefulness in regard to asepsis, and the health of the apical tissue is unimpaired, we can yet spoil it all unless the canal is completely and aseptically sealed. No canal can be completely sealed by placing a long cone of gutta percha into it and attempting to pack the part remaining in the pulp chamber. The technic of filling canals with gutta percha worked out by Dr. Callahan, and called the Callahan method from coast to coast of this country, is one by which the operator can be assured of filling all the open space in a root canal no matter how curved or tortuous it may be. In canals where the apical foramen is very small or cannot be penetrated by a broach, this method of dissolving cone after cone in the chloroform-rosin solution by pumping the cone up and down in the canal filled with the solution, until it has become filled with a dense plastic mass, and finally packed down with pluggers, is a method unexcelled. However, many canals have open foramina through which this solution of chloropercha will be forced in an increasing quantity as the operation continues, so that when completed an excess is left in the apical tissue which causes some troublesome pericementitis.

A very large per cent. of canals can and should be enlarged until a number 34 canal plugger will pass within two millimeters of the foramen. Now with the exact length of the canal taken from the measurement wire and marked upon the number 34 canal plugger, preferably by making a sharp bend at that point, the plugger is tried in the canal while the process of enlargement or curettment is going on, until it will pass to within two millimeters of the apex of that canal. When this has been accomplished the canal should be dehydrated with alcohol and acetone, then slightly moistened with eucalyptol. Now we have a canal thoroughly clean and open sufficiently to allow our plugger to pass within two millimeters of the foramen. All the space to be filled beyond the plugger must be estimated from our measurements and radiograph. A short piece of gutta-percha cone the proper size should be selected, about three millimeters long, and attached to the end of the plugger by heating the plugger. The space to be filled might be entirely filled by the cone; however, it is advisable in most cases to carry a small drop of thin chloro percha to the apex on a smooth broach, to insure filling all the open space. The plugger carrying the three millimeter cone is passed into the canal to the marked place and the cone packed into the canal.

You will readily see that this reduces the uncertainty of canal filling to a minimum, since the amount of space to be filled by guess is so small.

Should the amount of gutta percha carried on the plugger be sufficient to fill to the apex, the excess can only be a portion of the drop of chloro percha used, which is not enough to cause severe pericementitis following the operation. The remaining part of the canal is of little consequence if the foramen has been sealed properly by the first piece of gutta percha. The operation is continued by carrying short pieces in the same way into the canal and packing them down each time. When the canal is full it should be sealed with a hot burnisher and radiographed.

SUMMARY

It is impossible to consider all questions involved in treating and filling root canals at this time. In regard to pulp removal, I wish to include in this article simply a statement that the operator should at all times keep in mind the importance of the health of the apical tissue and, regardless of the method employed, great care should be taken to preserve or to restore a healthy condition. Strong caustics and strong disinfectants should be used sparingly and most cautiously, and when possible should be avoided. Pulp removal should be considered from the standpoint of the possibility of cleaning and filling the canals thoroughly where the matter of choice can be considered at all.

Pulpless teeth are difficult to handle where the apical tissue is diseased. The tissue cannot be restored to health by simply sealing disinfectants in the roots. Dr. Weston A. Price reports that by no method of treatment through the canal can the entire infection be removed from an infected apical area. However, the process of carefully and thoroughly cleansing and curetting the canal, followed by filling to the foramen with as little injury to the soft tissue as possible, will many times leave the balance of power on the side of the tissue and the diseased condition will resolve to normal.

The study of tissue regeneration by radiograph is very interesting, and I *believe* many rarefied areas will be all cleared up in due time when canals are *properly cleaned and filled.* Many cases require root resection, but perfect canal filling comes first.

Much time and patience are required to properly clean, enlarge and fill molar root canals, but people are demanding this kind of service in spite of these difficulties, and since our profession as well as the general public has been awakened to the vital relation between poorly-filled root canals and systemic disease, there is nothing less to be expected of us than to meet the demands of the time with a technical skill as well as scientific knowledge that will furnish immunity to the vast throng of the present generation coming for our best services.

25 East Washington St.

DISCUSSION

Dr. A. C. Barclay, Pittsburgh: It seems to me that I ought to mention something that has been very helpful in my root-canal surgery, so that it may benefit some who never have used it.

Some years ago Dr. Black painstakingly gathered and measured a thousand samples of each tooth of the human mouth, and published a chart showing the shortest, longest, and average length of each tooth. I have a copy convenient to refer to, and find it very helpful.

To illustrate: If operating on first bicuspid, I know I must get 17m., and not more than 22m., and feel satisfied when I get sensation at 20m. An operator cannot conscientiously fill a tooth 16m. long, when this chart shows that out of one thousand, Dr. Black did not find that particular tooth to be less than 17m.

I trust some of you may find the chart as helpful as it has been to me.

Dr. J. F. Biddle, Pittsburgh: For several years in a hospital here in Pittsburgh, we have been following chronic cases of arthritis, also other systemic disorders; therefore we know that the report of conditions in Chicago hospitals is not exaggerated, although I have heard many say that they could not be true. With the doubters, it is simply an instance of their not having followed the various cases.

A few years ago we thought we had learned all there was to be known about root-canal technic, and a paper on this subject was a bore to many. We find, however, in the light of recent investigations that we must revolutionize our methods of root treatment and perfect our technic. I believe the time is not far distant when pulp-canal treatment will be referred to practitioners doing this kind of work exclusively, just as many cases of orthodontia, extraction and oral surgery are referred to specialists along these lines before being returned to the original dentist for completion of the other part of their dental work, fillings, crowns, etc.

The essayist has spoken of the difficulty of securing correct radiographs, which is an essential in diagnosis. A poor radiograph incorrectly taken may cut out a rarefied area completely; or place it over another tooth; show teeth involved in an abscess or cyst when they are perfectly healthy; roots penetrating the maxillary sinus when they do not, or vice versa; cut out a fracture; and I know of one case where a fracture was depicted where none existed. In the latter case the patient's jaws were wired for two weeks when a second radiograph revealed the absence of a fracture.

Asepsis in Canal Operations: I fear that the profession as a whole does not give this department of dentistry sufficient attention. I was endeavoring to devise a handpiece for a dental engine which could be removed and sterilized easily. Upon speaking to a dental manufacturer about it, he replied that his firm would not be interested because the average dentist did not care about sterilization unless it made a show, and the article would be a commercial failure. For the good of our patients, as well as our own standing as a profession, it is up to us as dentists that such impressions be corrected and that every means of sterilization be employed, especially in the treatment of root canals.

In closing, I would like to emphasize two important points. First, that if a tooth has an abscess or a rarefied area at the apex, cure this condition either by treatment, curettment, or extraction. It makes no difference if the patient be apparently in perfect health at the time, you know not what may develop. Second, I would not treat and fill a root which is so affected by pyorrhea that it requires a splint to retain it in the mouth. I have done so, but in view of recent discoveries and investigations I am convinced that it is now an antiquated method. A tooth that requires an artificial support to retain it in the mouth should have no quarter in the oral cavity.

H. C. Werts, Beaver Falls, Pa.: I consider myself very fortunate in having had the opportunity of hearing the paper of Dr. Coolidge on Modern Methods of Root-Canal Treatment and Filling, and I think it is the last word on the subject. It is needless to say it would be most impossible to add anything to the paper, but it may be well to mention some of the more important points. Every dentist who has not already done so, should acquaint himself with the smooth, fine broach, known as the "path finder;" also with the apex curette. Their use is indispensable in proper root-canal work The extra fine Kerr file is a very useful instrument in root-canal work, using it with a filing motion, not with a twisting motion. I was pleased to hear the essayist say that medicines played a small part in root-canal operations. A very important point mentioned was gaining access to the canals.

We should gain free and unobstructed access to the orifice of each canal. Do not save the crown at the expense of the root. In mentioning the procedure of filling the root, the first step was to carry a drop of eucalyptol compound to the apex of the root. This is easier said than done. The liquid must displace the air at the apex of the root. The best method of accomplishing this is to carry the liquid to the canal with a pair of dressing pliers and, by capillary attraction, permit the liquid to enter the canal as far as it will. By using a square annealed broach, work the liquid to the apex. A round tapering broach entering a round tapering canal, has a valve-like action, while the fine square broach entering the tapering canal, comes in contact with the walls of the canal, at the angles of the broach, permitting the air to escape and the liquid to take its place.

ROOT-CANAL THERAPY*

BY FRED D. MILLER, D.D.S., ALTOONA, PA.

IN OFFERING THIS PAPER on root-canal therapy, it is my desire to stimulate discussions and to facilitate hopeful experiment in this field. If this paper were a conglomeration of my own ideas, I would not be so impertinent as to hope that it would be interesting to you.

The subject of proper root-canal therapy is one that is receiving entirely too little consideration from most dentists, and although there are quite a few men in the profession who have done and are doing a lot of good work along these lines, the number compared to the number of dentists is certainly a small proportion.

Perhaps the final word has not been said; perhaps all of the things have not been discovered in the proper treatment and filling of root canals. Herbert Kauffman said, "No man will ever perfect anything," and I believe this is true. What we think is the best today may be discarded tomorrow for something better. This thought, however, is not a reason for us putting off until tomorrow that which we should be doing as we think right today.

The thing about root-canal work that impresses me most forcibly is that at the present time over 200 of the most prominent dentists in New York City have adopted the Rhein method, and these men certainly have not done this without careful consideration of all the methods at hand.

This subject is of such vital importance and the unwanton neglect of it is so prevalent that it is my belief that some drastic action should be taken upon it by a group of eminent men, appointed perhaps by the National Dental Association, and the most advanced ideas on this subject be adopted as the proper method and the other methods discarded. Just as it is considered by surgeons a crime to operate without regard to asepsis, so should it be in our profession, when a root-canal operation is to be performed.

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*Read before the Lake Erie Dental Society, 1916.

The adoption of this standard would, I think, be a step forward. It has been proven that there is no such thing as a permanently antiseptic root-canal paste. As Dr. Best says, "They may ease the mind of the operator, but there the service ends," and Dr. Callahan has stated that, "The idea of a mummifying paste is a myth, born of a desire to shirk the responsibilities which we assume when we enter the practice of our profession." These statements are not unsupported.

The danger which may arise from the neglect of a proper understanding of focal infection, cannot be too strongly emphasized. The research work of Drs. Rosenow, Billings, Hartzell, Henrici, Price and others has amply demonstrated that no longer can we look lightly upon the careless removal of pulps and the subsequent treatment of the root canals, and when we realize that every time we introduce infection into a canal or fail to obliterate periapical infection, or fail in sealing that canal against future infection, that we are endangering the very lives of our patients, the sooner we will adopt a technic that will be safe, whether that be extraction or a proper root-canal technic.

A problem, then, to be solved is, how are we to get the dentists to adopt the technic of proper aseptic root-canal work (for it seems that the Rhein method meets all the requirements as to the technic of the operation). I can foresee malpractice suits and convictions for the dentists who continue to rely upon unscientific methods.

It is certainly up to us to solve this problem, before we are compelled to do so by our medical brothers. When the internist learns (and he is learning) that he can get no response, in a great many cases, of those conditions which involve the heart, joints, muscles, etc., until these infective foci about the roots of the teeth have been obliterated, then look out! *Hunter's denouncement of American dentistry will look like a mild affair compared to the denouncement we will get if we don't wake up and get busy.*

When such apparently remote conditions as arthritis, neuritis, infectious endo-carditis, and a score of other conditions are every day being traced to the teeth, it is then certainly time that we adopt the most advanced thought on this subject and apply the fruits of the extensive investigations made by Drs. Rhein, Best, Price, Callahan, Ottolengui and others, to our daily practice.

Dr. Rhein has said, "In all forms of dental therapy except root-canal therapy, it is possible to speak of results in a comparative way, so that even a fourth-grade inlay may be of some benefit. In root-canal therapy there can be no such comparatively good operations. The result of the treatment must leave the pulpless root in such condition that not only infective foci have been obliterated, but reinfection around that particular root is made impossible. If this is not accomplished the patient has been seriously injured instead of benefited, so that if such results cannot be obtained the tooth must be extracted as the lesser evil; sacrificing the tooth in order to avoid a possible toxemia."

According to Rhein, there are three essential points in pulp-canal technic. I will endeavor to take them up, one at a time, and explain them.

First: "The removal of every particle of pulp tissue." This is accomplished by the use of NaK solution, or Schrier's Paste. After the pulp has been removed with barbed broach and the hemorrhage is stopped, NaK in minute quantities is worked into the canal, using a smooth broach, care being taken not to introduce this material in too large quantities, as the reaction when it comes in contact with moisture is very violent. The NaK, because of its affinity for moisture, saponifies the organic contents of the canal, facilitating the removal of the contents. Care must be taken not to force the NaK through the foramina, as severe periapical irritation will result. The NaK is used in all canals whether the tooth has just been devitalized or is putrescent, as the important point is to remove the organic tissue which, if allowed to remain, will soon form pabulum for bacteria. Unless the organic tissue is all removed, the filling material, no matter what it may be, will be surrounded by this organic matter, and the canal cannot be hermetically sealed; this is an important point. This is the reason some claim gutta percha is absorbent because we have all removed gutta percha from canals that were putrid. I want to call your attention to the fact that even a removable gold bridge will be putrid if it is covered with putrid material, and I do not think gold is absorbent; and I believe if it were possible to remove a putrid gutta-percha root filling, and remove the external without infecting the interior, we would find it to be sterile. After you have worked the NaK to the apex, this is washed out with Marchand's peroxid and bichlorid solution and dried. If the canal is to be filled at this sitting, you are now ready for ionic medication.

The second point: "The extirpation of every pathogenic condition."

There are to my knowledge, I believe, just two methods of obliterating periapical infection of the cystic or granulomatus type. One is by apecœctomy, and the other by ionic medication. I will digress here for a moment to say a few words about this subject. Sturridge has defined ionic medication as follows:

"Ionic medication may be described as a method of treatment in which electrical currents are used to conduct or convey in a definite direction, ions of solutions which are dissociable by the electrolytic actions of the currents. The body contains combinations of chemical substances which are soluble in water, and which are good conductors of electricity; it is therefore an electrolyte, which, when current is passed, responds to the electric laws of decomposition of solutions and movements of ions toward definite poles. The ions are the dissociated charged atoms which move in definite directions; those that are positively charged (cations) move toward the negative pole, and the negatively charged (anions) move to the positive poles. In ionic medication the dissociations of acids, alkalies and their salts by the action of the current, provides definite working bodies in the application of drugs for their medication properties.

"Many salts provide ions of a high antiseptic nature; and when these are introduced electrically into the tissue, they are not readily absorbed into the general circulation. The question naturally arises to the mind, do the ions really penetrate the tissue, and to what depth do they penetrate? Clinical results recorded by many eminent workers in electro-therapeutics seem to be proof enough that many ions such as zinc, copper, silver, iodin, etc., penetrate the tissue and exercise an antiseptic and healing effect."

To get back to the root canal we are treating; the canal is dried and we now introduce three per cent. solution of zinc chlorid (or a normal salt solution will do), and a fine zinc wire for the positive electrode. Next, the negative or indifferent electrode is attached to the wrist or held to the wrist by the patient. The current is now turned on by the assistant, and is gradually increased until the patient notices a burning sensation (this will be noticed when the milliampere meter registers from 1 to 6 milliamperes, because of the difference in the resistance of different individuals). The current is now turned back until it is comfortable. The duration of the application depends upon the current strength, the size of the area involved; when a current of 1 and 2 milliamperes is passing the duration will be from five to twenty minutes.

The third point: "The hermetical sealing of canal so that reinfection is impossible."

The canal and periapical tissues are now ready for the root filling, and everything we introduce into the canal must be sterile. We do not want to reinfect it now. The canal is again dried out, using sterile canal points and a canal drier. I also use extra fine Kerr reamers wound with a wisp of bibulous paper, which have been sterilized.

Next, with a smooth broach, chloro-percha is pumped into the canal. This is followed with gutta-percha points, using very fine ones, so as not to block the canal (the gutta-percha points are kept in alcohol). The points are now packed in the canal tightly, our object being to make the complete root filling a homogeneous mass of base plate gutta percha from the pulp chamber just through the foramina, sealing the foramina from its periapical aspect.

LANTERN

Case No. 1—Fig. Nos. 1 and 2—Mrs. D., referred by her physician, had for two years been suffering from neuritis of neck and arms. Clinical examination revealed two pulpless teeth, centrals; radiograph showed rarefied area of apex (Fig. 1);roots opened; had been filled with "a gutta-percha point." Roots were cleaned out with NaK, ionized and filled. Result in Fig. 2; neuritis cleared up entirely by the end of the third week, and patient has had no recurrence of it. This was two years ago.

Case No. 2—Fig No. 3—Mr. S., age 61, had never lost a tooth; no pyorrhea present but some salivary calculus, which was removed. Attack of neuritis of right arm for past year. Had consulted specialist in Philadelphia, and had not had any relief. Also, spent several weeks in Mt. Clemens, Mich. Relief only temporary. When the patient first came to my office, he could not move arm nor fingers except very slightly. Had had arm in splints for three months, and also had taken morphia for three months. Clinical examination, foradic test showed two pulpless teeth. X-ray showed very slight rarefied area at apex of bicuspid (Fig. 3). Molar decayed under crown, and pulp dead. These teeth were extracted. The following day he complained of increased pain in his arm. Three days later there was a marked improvement. Within three weeks his arm and hand were entirely well. The rapid recovery in this instance was remarkable. The reason for extraction was because the man was not physically fit for the ordeal of a necessary long dental operation.

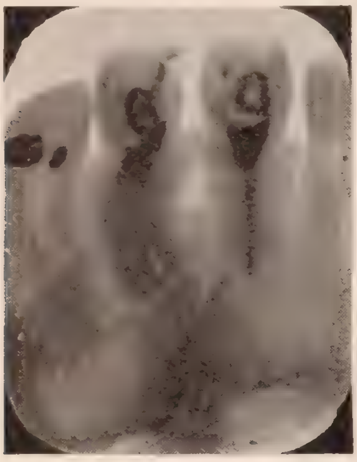


Fig. 1

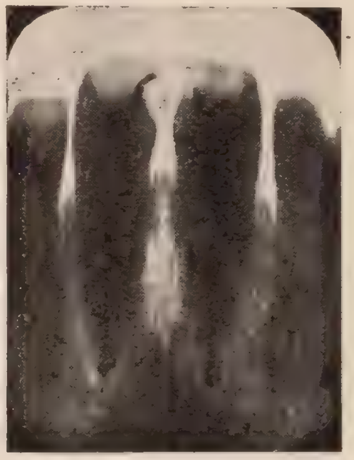


Fig. 2

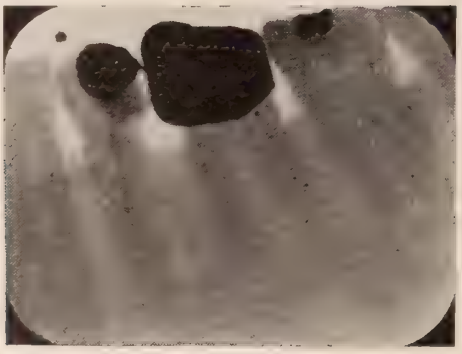


Fig. 3

Case No. 3—Fig. Nos. 4 and 5—Rheumatoid arthritis. Mrs F., nine lower anterior teeth. X-ray revealed six blind abscessed areas (Figs. 4 and 5). One chronic abscess with sinus. Five roots were treated, ionized and filled. One was extracted and one apecoectomy operation on cuspid; marked decrease in arthritis to date. Especially interesting in that seven out of a possible seven pulpless teeth showed rarefied areas. The other two were vital. Case not completed at this time.

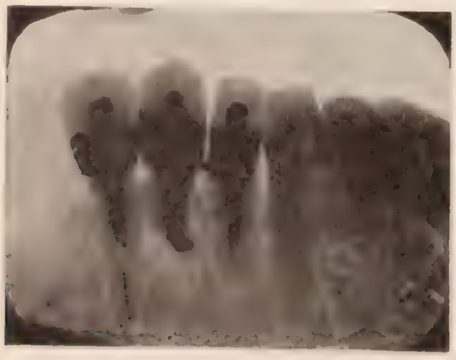


Fig. 4

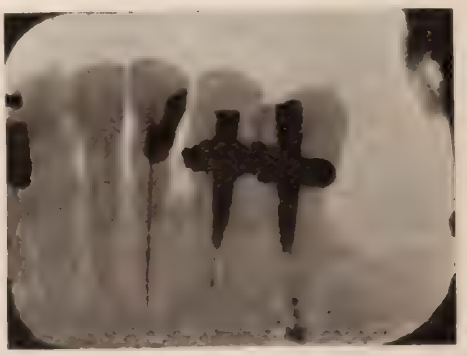


Fig. 5

Case No. 4—Fig. Nos. 6 and 7—Miss F., marked improvement in arthritis, following these two root treatments.

Case No. 5—Fig. Nos. 8 and 9—No apparent systemic involvement. This tooth had been treated by the "cotton method;" for two years could not be kept sealed for 24 hours.

Following ionization we were able to keep it sealed, and since this root-canal operation, the tooth has not given any local inconvenience.

Case No. 6—Fig. Nos 10, 11 and 12—Shows value of diagnostic wire in canals in locating direction. It was necessary to remove a perfectly good mesial occlusal inlay in order to get access to the roots. Sinus has entirely healed since operation. No apparent systemic involvement.

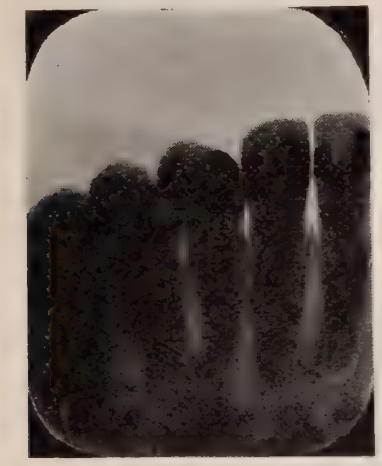


Fig. 6

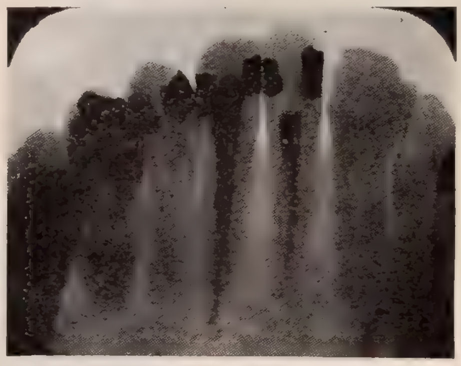


Fig. 7

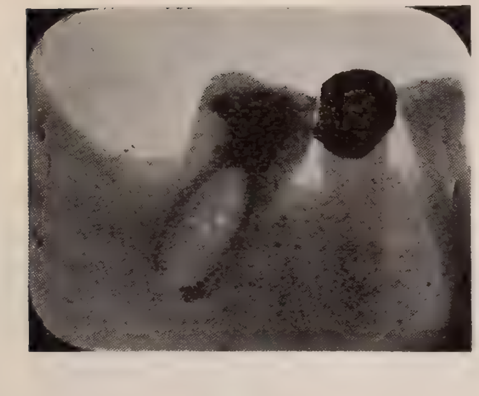
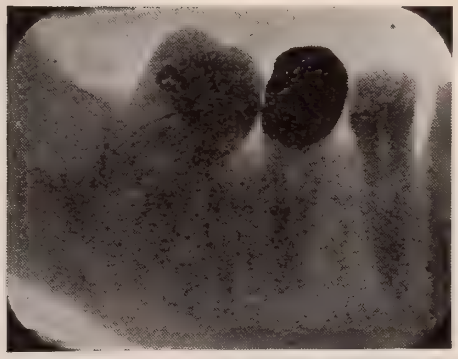


Fig. 8



Fig, 9

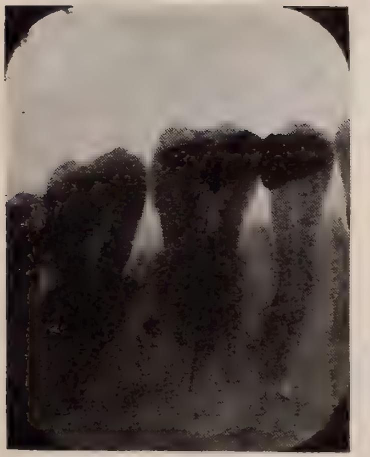


Fig. 10

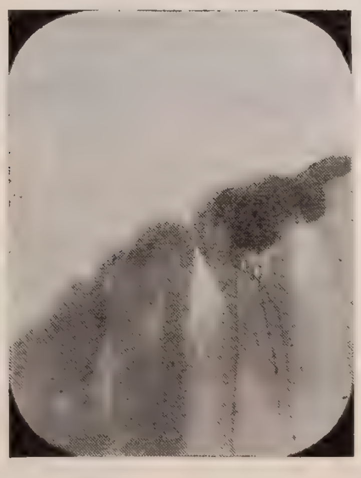


Fig. 11

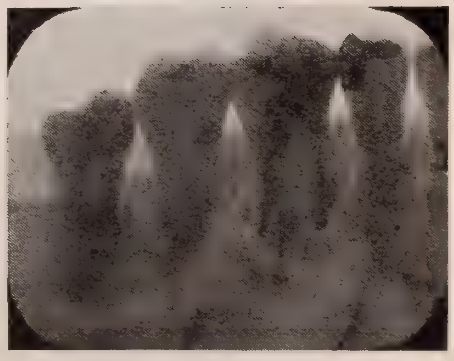


Fig. 12

Group No. 7—Fig. No. 13, before; 14, after. No. 16, before; 17, after. No. 18, before; 19, after. Nos. 15 and 20—A series of films showing the writer's idea of ideal root-canal fillings just through the apex, sealing the canal from its periapical aspect.

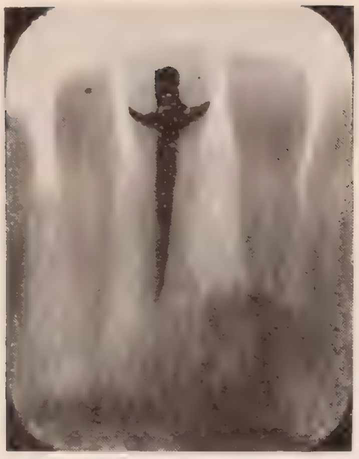


Fig. 13

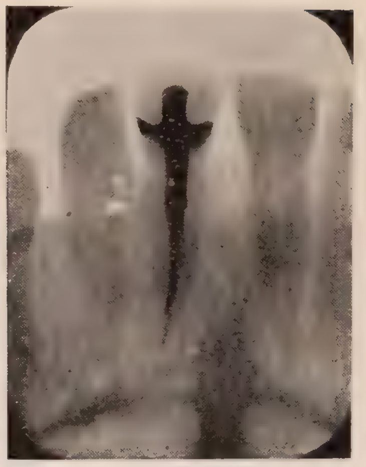


Fig. 14

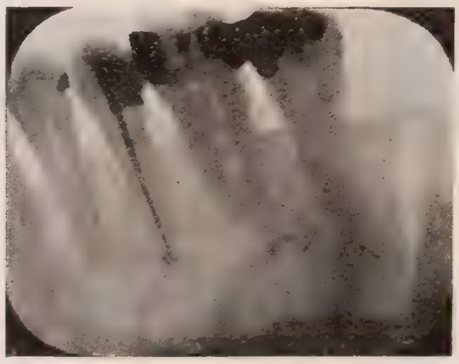


Fig. 15

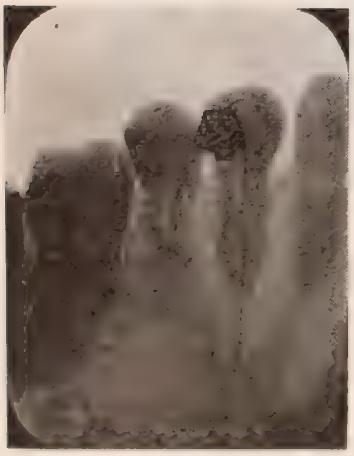


Fig. 16

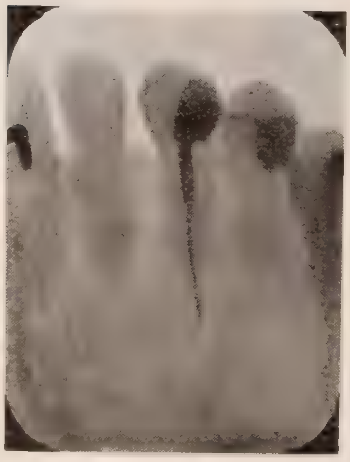


Fig. 17

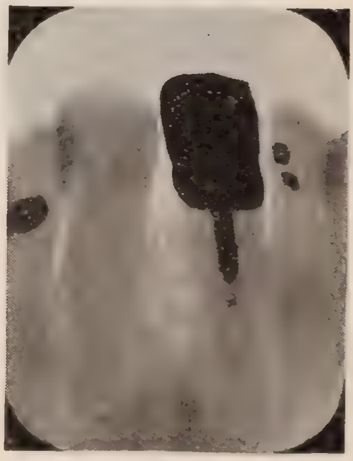


Fig. 18

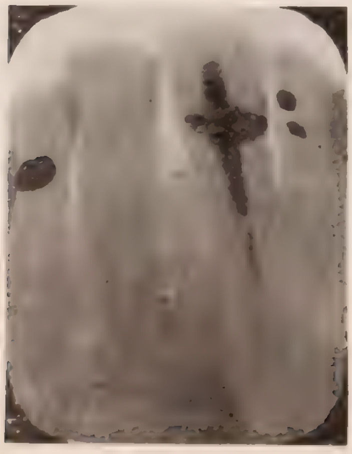


Fig. 19

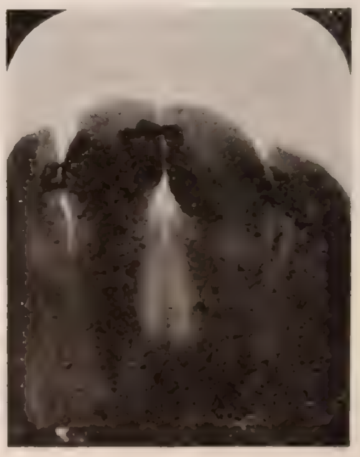


Fig. 20

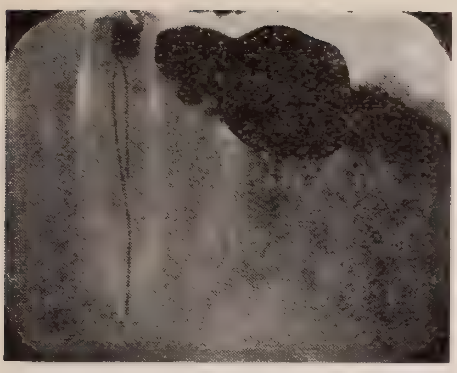


Fig. 21

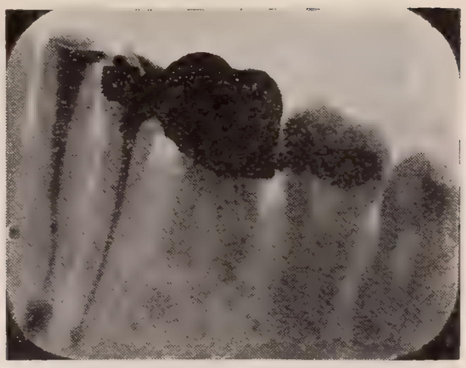


Fig. 22

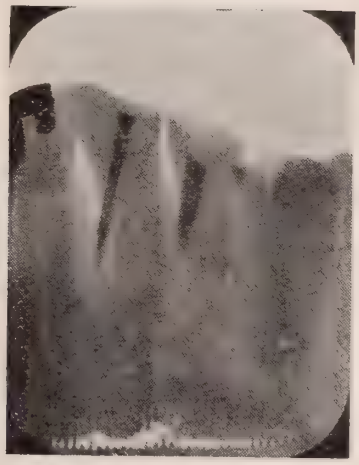


Fig. 23

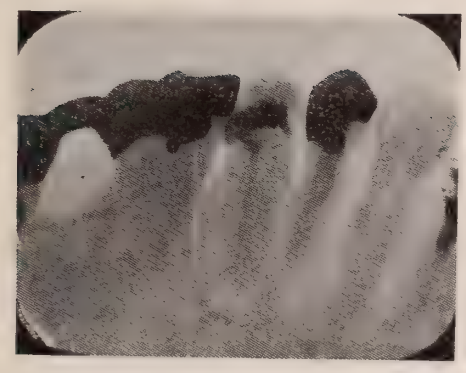


Fig. 24

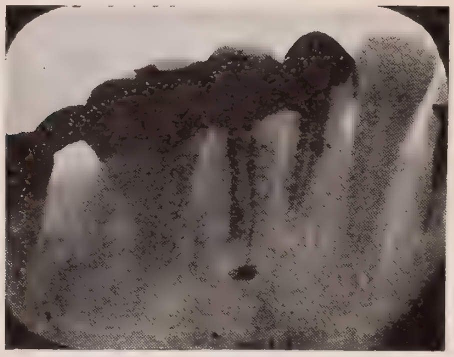


Fig. 25

Case No. 8—Fig. Nos. 21 and 22—An extreme case, showing a large amount of gutta percha through apex. There was absolutely no periapical soreness following these root fillings.

Case No. 9—Fig. No. 23—An interesting film, showing gutta-percha cones through side of roots. This operator must have been drunk, or his idea of angles is very vague.

Case No. 10—Fig. Nos. 24 and 25—Upper second bicuspid in writer's mouth, had root filled three times, and finally extracted. Root had abscess sac on distal side extending from apex half way to gingiva, and root had been perforated in two places, and had two root canals with one foramina.

Notice first bicuspid roots filled with a "gutta-percha point." Note how they twist around like a cork screw. Such root fillings do not seal a root. The completed root filling must be a solid homogeneous mass of base plate gutta percha through the apex to the pulp chamber.

Case No. 11—Fig. No. 26—Shows the possibilities of gutta percha and chloro-percha as a root filling material. Notice how the gutta percha has been forced through an accessory foramina, at right angles to the long axis of the root about the middle, and from that canal again to the apex parallel with the main canal to the apex. The canal filling should be packed under great pressure.

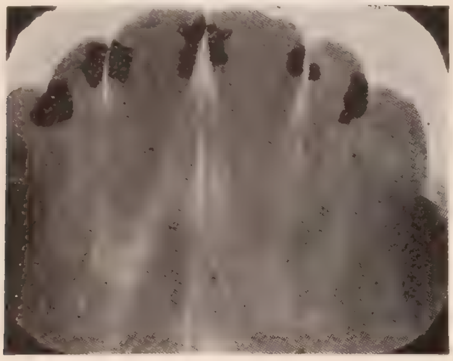


Fig. 26

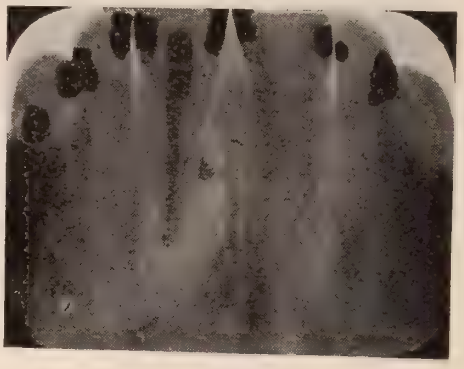


Fig. 27

1122 Twelfth Ave.

ORAL AND SINUS SURGERY UNDER NITROUS OXID-OXYGEN ANESTHESIA IN THE FORWARD INCLINED SITTING POSTURE*

BY IRA O. DENMAN, M.D., TOLEDO, OHIO.

PHILOSOPHIZE as we may upon the great mystery of human life; speculate and theorize upon the whole plan of existence; be we orthodox or evolutionists, the predominant fact is, that we are here on earth for an indefinite period, and that our residence here is pleasurable and profitable or the contrary, according to numerous conditions in and about us.

The range and variations of the human race are so great that there are but few things common to all men. Some one has said that the six feet of earth is the common level, but before that state is reached, there is a proposition upon which all men, great and small, rich and poor, learned and unlearned, may unite, and that is that good health is the greatest blessing of life. Health is more to be desired than anything else in the world. True, it must often be impaired or lost in order to be appreciated, but when lost, its regaining becomes the supreme object in life. Fortunes, great and small are laid down at its shrine. Sickness and death are terms which strike terror to the hearts of all men. Nature's strongest instinct is self-preservation. It pervades all forms of life. To it is due the perpetuation of all life. This instinct is predominant in the human species. We call the antithesis of health, disease. The guardian of health and the relentless foe of disease is the physician.

If then it is given to us—and I beg to be understood to include under the term "physician" all who labor in the field—under whatsoever heading—

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*Read before the joint session of the Interstate Association of Anesthetists and the National Dental Association, July, 1916 be it internest, dentist, anesthetist, surgeon, ophthalmologist, laryngologist, or the family doctor; if as I say, it is given to us to foster and protect the thing of supreme value to all classes of people—should we not feel proud of our calling, and see that such pride is not unmixed with a due sense of the grave responsibility which we assume to our fellowmen upon donning the mantle of the greatest of all professions?

The age of truly great progress and scientific accomplishment in medicine and surgery dates from the discovery of anesthesia and bacteria. True, there are many diseases which are not due to bacterial action, but in this discussion we shall consider only those conditions which arise from infections, and some of their surgical requirements. Again we find a division of infections as to their origin, either within or without the body, into exogenous and endogenous.

In recent years we have heard much of focal infections, and today we are endeavoring to measure their far-reaching effects and to cope with some of them surgically.

The profession generally owes much to the dental pathologist for his pioneer discoveries and invaluable contributions to this very important question. In fact, I wish that I might pause here and pay a fitting tribute to the American dentist, who so far outshines his European colleague as the sun does the moon; whose prowess no longer lies in the celerity with which he can separate one from his "ivories," in which age his highest ambition was to become notorious as the "lightning dentist," but who now seeks to excel in prophylaxis, and finds his chief delight in preserving to us that which his predecessor could only destroy.

May I say further, that to my mind the dentist is really a specialist in the field of medicine and surgery, having in his especial care the oral cavity—the gateway to the alimentary and respiratory tracts and so of infinite importance.

The almost marvelous progress of dental science in America is better realized when we reflect that less than two centuries ago, the blacksmith was the tooth extractor, while the barber honed his razor to perform phlebotomy, from which practice the modern tonsorical sign gets its blood-red stripe.

Only recently the writer was told by a guide in Boston, of the versatility of Paul Revere, who before his famous ride, had achieved local prominence through his skill as a silversmith, goldsmith, coppersmith, blacksmith and dentist.

The anesthetist called in upon those occasions is not described nor even mentioned, but no doubt, he or they were the Jess Willards and Frank Gotchs of that period. No less striking contrast is presented in the field of anesthesia, from the patient being brutally held upon the table by pugilistic strength, to the calm peaceful slumber for hours if need be, under modern scientifically controlled anesthesia—represents the two extremes.

The surgeon must ever be mindful of the invaluable assistance of the anesthetist to whose achievements in his field, surgery owes so much

Returning to our subject, we know that in points of lowered resistance occur culture-beds for bacteria. Some locations for these are the alveolar processes; the tonsils and the nasal accessory sinuses. Pathogenic microorganisms here find the requisites for their propagation, warmth, moisture and pabulum, when such points become veritable hotbeds for the breeding of disease

The infection invades the lymph and blood currents, polluting the same, and the vital organs are thus supplied by a devitalized and impoverished stream. In time, the individual's health is impaired, either by a general inefficiency of the bodily functions or by the direct entrance of some definite disease.

This is the age of sanitation and prophylaxis in medicine. The whole trend of scientific endeavor is toward prevention rather than cure of disease. A gigantic wave of instruction to the laity, such as the world never has seen before now is sweeping over the country, teaching the people how to keep well. Columns appear daily and weekly in the public press, and these silent monitors do much in the humblest homes to diffuse the light of knowledge concerning this paramount issue. Much of such literature properly conveys to its readers the essentials of pure air, sunlight, good food, proper clothing, exercise, clean streets and alleys, good drainage, etc.

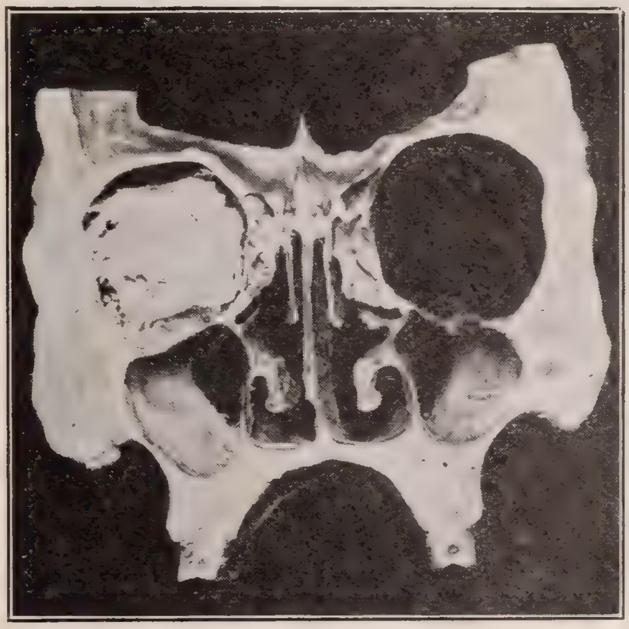
More minutely must we show them that in addition there are great dangers to be found within their own bodies. There are hidden foes—focal points of infection within the tonsils, sinuses and in the gums—which cause many diseases such as rheumatism, endocarditis and tuberculosis, and we must "clean house" by eliminating from our bodies such hotbeds for bacterial growth.

Modern surgical methods, under modern anesthesia, may as it were, pluck the thorn from the flesh and not only lengthen the span of human life, but make for greater efficiency, health and happiness while we abide.

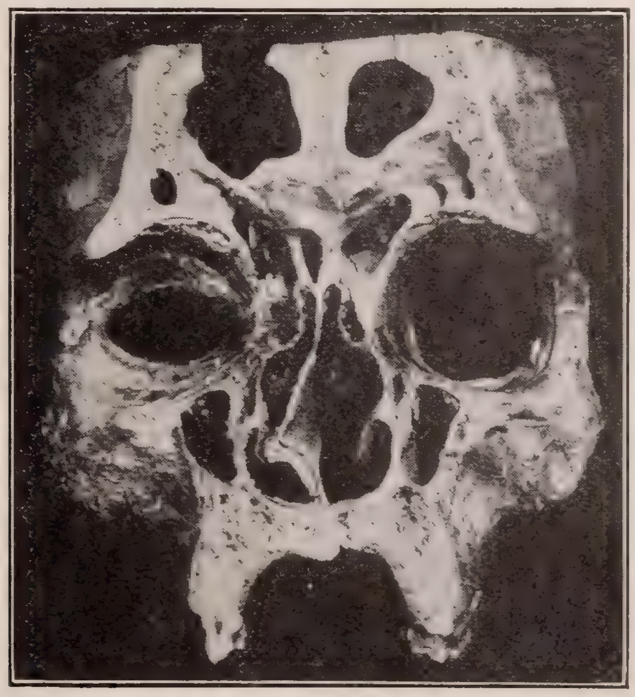
A well-known internist states emphatically that "the removal of the focus of infection is demanded as a fundamental principle in the treatment of systemic diseases of the chronic type," and farther, "to the now well-known relation of focal infections as a chief factor in the etiology of acute rheumatism, chronic deforming arthritis, gonorrheal arthritis, malignant endocarditis, myositis, myocarditis, septicemia of various bacterial types, tuberculosis, nephritis and viceral degeneration, we may add certain infectious types of thyroiditis, with or without hyperthyroidism, pancreatitis, acute and chronic, with or without resulting glycosuria, peptic, gastric and duodenal ulcer and cholecystitis."

Unfortunately, the recognition or diagnosis of a focal infection is not always an easy matter. If it were true that its presence were always a subjective manifestation, then more often would they be detected. On the contrary, however, there are often absolutely no local symptoms, such as pain or soreness, and thus insidiously is the patient's health undermined.

Alveolar abscesses often are unrecognized by the patient, and only film Roentgenograms disclose their presence. Chronic sinusitis may exist for years unknown, and a large percentage of chronic tonsilar infections which are so extensive as to ruin the health, frequently give no rise to sore throat.



Cross-section of the bones of the face, normal specimen. Note the wide free passage between the antral walls and the middle turbinated body and the septum.

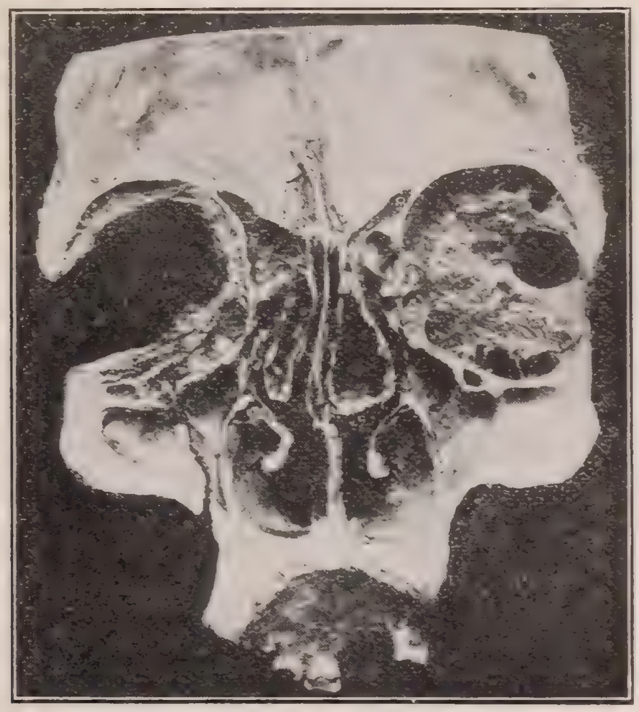


Cross-section showing deflected septum, which partially obstructs the drainage and ventilation of the sinuses.

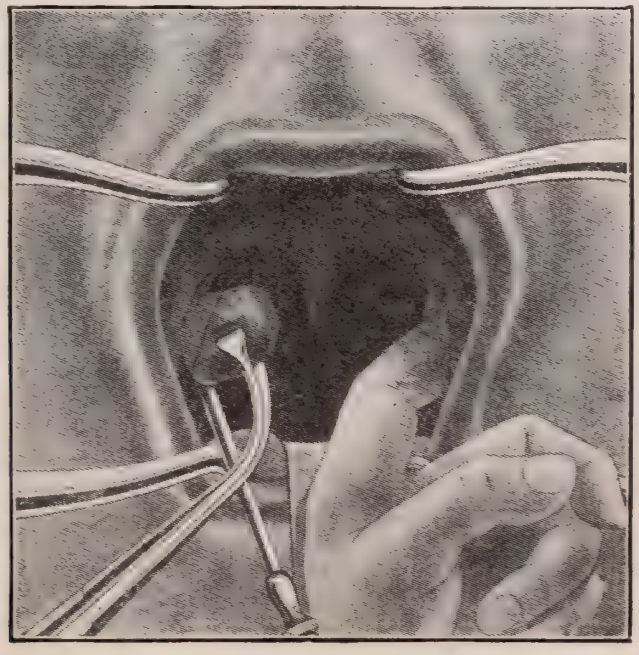
The treatment of focal infections is essentially surgical, either to establish drainage and ventilation or to extirpate the infected tissue. I shall gladly omit those renal, appendiceal and other foci belonging to the general surgeon, from this paper. Neither shall I presume to discuss those of the alveolar processes before this body, but I shall limit my remarks to the sinuses and tonsils, which are of interest to dentist and rhinologist alike.

The nasal accessory sinuses are the frontal, ethmoidal, sphenoidal and the maxillary or the antrum of Highmore. Physiologically they act as an auxiliary to the nose in supplying moisture to the air we breathe. They also increase the resonance of the voice and strengthen and lighten the bones of the face. These cavities depend upon two things for their hygienic state—ventilation and drainage. Any deformity, injury, or disease within the nose which interferes with the ventilation or drainage, may prove to be the cause of an acute or chronic sinusitis. The ostea, or openings of all these sinuses, except the sphenoid, is found in one vital area in the nose. This is the hiatus semi-lunaris, or the uncinate groove, beneath the middle turbinated body. This is called the "vicious circle" of the nose. It is here that trouble most often originates. Anything, such as septal deflections, congenital deformities either of the septum or of the middle turbinate, or chronic catarrhal enlargements of the turbinates or new growths, polypoid usually in character, may obstruct the natural ostea of the sinuses at this point. Such obstructions, if long continued, may result in chronic sinusitis. The ethmoids are usually the first affected, the frontal next, then the maxillary, and the sphenoid last of all.

The maxillary sinus, by reason of its peculiar position relative to the "vicious circle," being below it, and having its natural opening on a level with its roof, is by its natural formation particularly susceptible to infections which gravitate into it from one or both of the sinuses situated above. Drainage is unfavorable from it because the secretions have to run up hill, as it were, to the ostium. Infected material, therefore, may be imprisoned in this cavity, which is a veritable trap for the dregs from the nose and other sinuses. At the most dependent portion of this sinus, and thus where the toxic matter would be expected to gravitate and remain, we find the roots of the teeth penetrate into the antrum cavity. These roots are covered only by mucous membrane. With this anatomy, dental surgeons are quite familiar, but dental pathologists have been too generous in accepting the majority of the responsibility for antrum infections, claiming as high as 75% of such cases arise from dental infections. That some cases do owe their origin to a primary dental caries which breaks through into the antrum, there is no doubt. However, allow me to repeat that the maxillary sinus is an accessory nasal cavity having a natural opening into the nose, and not an accessory oral cavity. I personally never have seen a case of abscess of the antrum which did not present some signs of a co-existing intra-nasal infection. Furthermore, given a case of chronic antrum infection, where there has been retention of toxic material for a long time, this material gravitating to the most dependent portion, which is the location where the roots of the teeth penetrate, I ask is it not possible, or at least reasonable, to expect that such teeth may become infected *from* the antrum, and thus reverse the supposed order? Therefore, I wish to take the advanced position of relieving the dentist of much of the responsibility for the disease of this sinus, believing that dental infections are often secondary to nasal infections in this region.



Cross-section showing large middle turbinated bone which occludes the maxillary sinus osteum. This turbinate is hollow, containing an accessory ethmoid cell, and is a congenital malformation.



The author's tonsillectomy. A second tenaculum and snare are applied when the finger completes the dissection, and both tonsils are simultaneously removed.

Whether or not this suggestion meets with your approval, my next statement must go unchallenged, and that is, that the average dentist fails to take advantage of the opportunity daily afforded him to be a leader in the field of prophylaxis, so far as certain focal infections are concerned. Too often he thinks only of alveolar foci. He should realize that his opportunity to discover also both sinus and tonsilar disease is almost enviable.

He sees diseased tonsils daily. He can with the aid of a nasal speculum see disease within the nose also daily. The nasal speculum should be a part of every dentist's equipment, and no dental examination should conclude without the inspection of the nose and also the tonsils, not only as a diagnostic, but as a prognostic measure.

It is my deep conviction that the intent of all surgical operations should be to restore the parts as nearly to the normal state as possible, with the least disfiguration in sinus work, keeping in mind a statement made earlier in this paper, that the health of the sinuses depends upon drainage and ventilation; these we first should restore to a diseased sinus, with the minimum amount of destruction of tissue.

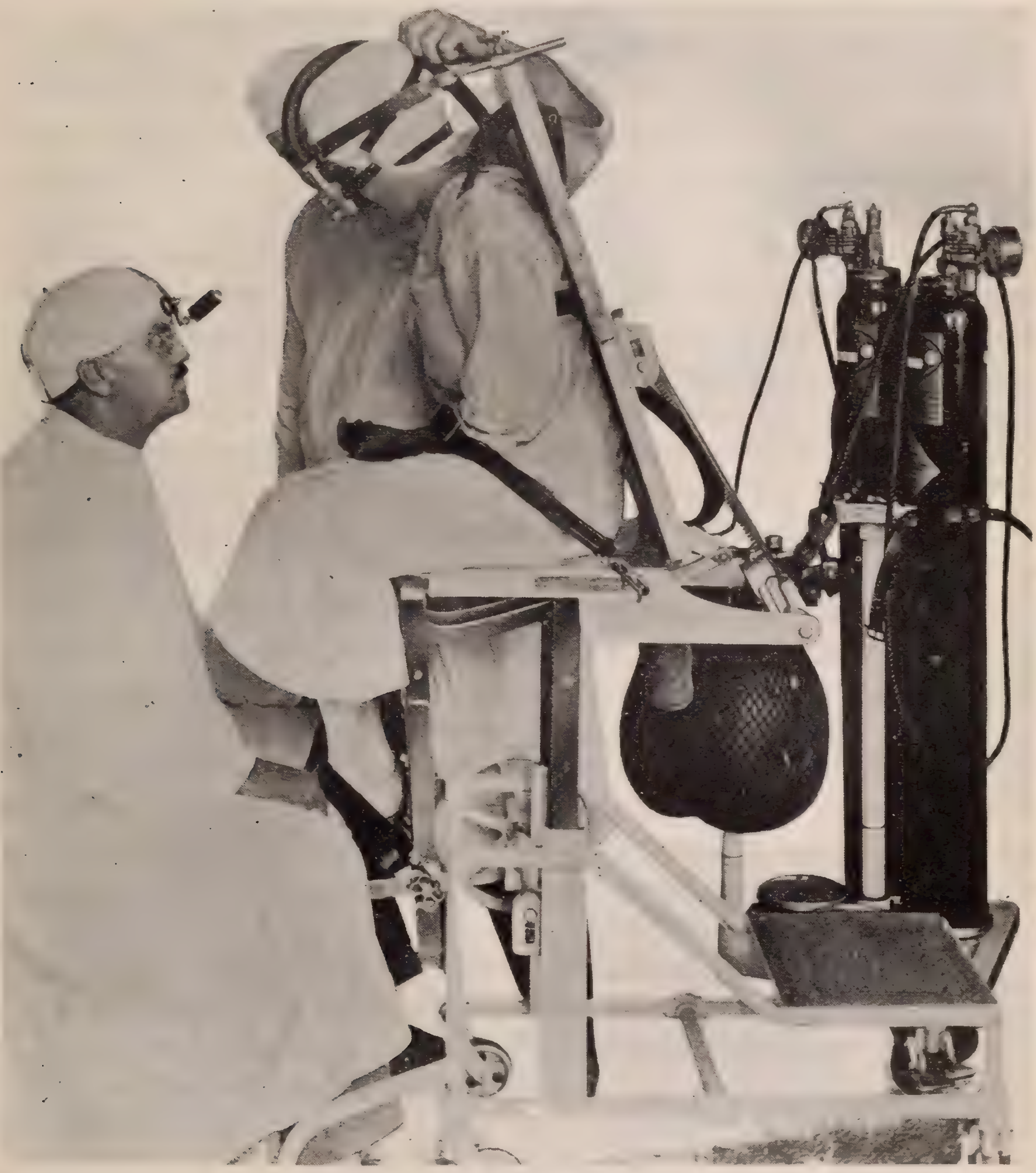
I decry the wholesale disfiguring external operations of radical sinus surgery, and plead for conservative assistance to Mother Nature by intranasal procedures wherever such means gives any promise of relief. No external mutilation of a patient's face is justifiable until after other measures have failed, and the removal of a sound tooth to secure drainage should not be the first procedure.

Intra-nasally, the region of the middle turbinate must be cleared and freed from pressure so that the sinus ostea may remain open. The middle turbinate must often be removed wholly, septal deflections straightened, polypi removed and diseased ethmoid cells opened for drainage or removed if necrotic.

Surgery of the maxillary sinus, a subject in itself, can only be briefly mentioned. Freeing the natural opening alone is sufficient in many cases. This together with a counter-opening in the naso-antral wall beneath the lower turbinal, sometimes removing a portion of the antrum end of the same, cures the great majority of cases. Some chronic cases with granulations, polypi and septi, require a large opening in the sinus wall to permit curettage and ocular inspection. For this there have been a number of methods proposed. Experience proves that the more the antrum is left as an accessory nasal cavity, that is, the smaller the opening in the naso-antral, wall the better. Large openings permit irritating substances from the air to maintain a constant irritation of the sinus lining membrane.

For the surgical treatment of nasal and sinus affections, I prefer nitrous oxid-oxygen anesthesia in the forward inclined-sitting position, later to be described.

The tonsil is without doubt the greatest offender in the whole field of focal infections. Tonsil tissue, especially after the activity of the gland ceases in early childhood, furnishes a most fertile culture-bed for microorganisms. Unlike most other locations, the focus is here accessible and permits of direct ocular inspection. Unlike sinus and alveolar process infections, which permit only of drainage followed by therapeutic measures to restore the parts to a normal condition, in the case of the tonsil the whole diseased mass is easily removed, thus eliminating at once from the body the source of toxemia. Unfortunately we meet an issue in the tonsil question which is not encountered in any other infected region—not even now in appendicitis—the teleological question. Every day, I am asked, "Why does Nature give us tonsils if they are not for some use?" and "Should they not be treated and retained?" and "If a portion of the tonsil only is diseased, why remove



Illustrating the author's tonsillectomy position. The forward suspended sitting posture for nose and throat surgery, nitrous-oxid and oxygen anesthesia (continuous) being used. Sterile dressings are omitted to show retaining straps.

the whole gland?" This last question is often propounded also by physicians, and some specialists still advocate a tonsillotomy; at least they perform that operation.

An attempt to answer these questions here would be an imposition upon your patience, as it would mean opening up a question the discussion of which is almost as voluminous as was that regarding the appendix two decades past. The following statements, however, are regarded by the writer as facts after careful observations: First, the tonsil function, if it has any, is performed and concluded in early life. Its activity ceases by the eighth to twelfth year, after which its decline begins and its tissues are incapable of repair. Second, like the man who says a thing cannot be done, is interrupted by some one else doing it, so those who declare that tonsillectomy should not be performed, are confronted constantly by its beneficial effects. I am speaking, of course, of diseased tonsils only, which through careful inspection by lifting the submerged tonsil out of its bed (and it is this variety most often diseased) an accurate diagnosis can be made. After the thorough removal of all tonsil tissue in its capsule, we note a certain and rapid improvement in health in every case.

To say, therefore, that tonsillectomy is overdone, simply because it is done frequently, is unwarranted. To say that it is poorly done, that it is attempted by men unfamiliar with its anatomical structure and surroundings—whose technic is faulty, and whose skill is unequal to the surgical requirements of the case, by men who are unable to cope with complications should they arise; whose instruments, anesthetic, position and methods are conducive to only a partial removal of the tonsil tissue, together with more or less mutilation of the delicate throat and palatal muscles, would be a broad statement, but if true, would account largely for the general dread of tonsil operations, and also for the continued ill health in certain cases owing to the retention of diseased tissue.

That there are certain dangers in tonsillectomy cannot be denied. It always is a major operation, preparations for it should be in keeping with those for major surgical operations. It always is a hospital operation.

It is the firm conviction of the writer that the common dangers can be avoided. Among these dangers are the anesthetic—asphyxiation from inspired blood and secretions, hemorrhage and shock

The anesthetic of choice is N_2O and O. It is not profoundly toxic such as chloroform or ether. Anesthesia is quickly induced. Its administration may be continuous, permitting an uninterrupted surgical procedure. There is absence of mucous secretions. Pure oxygen quickly awakens the patient, simultaneously checking any bleeding. There is no nausea following, and it is altogether not an unpleasant experience for the patient.

Inspiration of blood and secretions into the lungs is an immediate danger to the patient by asphyxiation, and a remote cause of pulmonary sepsis, pneumonia and death. Various positions, such as hanging the head downward, placing the patient on the side, and various aspirators and suction pumps have been devised, in attempts to exclude these secretions from the larynx, trachea and lungs—for bear in mind, that only in nasal or oral surgery including exodontia, does blood *per se* become a danger factor. A patient can drown from a much smaller quantity of blood inspired, than of water, because the attempted inspiration churns it up into a froth many times the bulk of the blood inspired. To avoid this danger in nasal and oral surgery, I have, in my technic, called to my assistance a great natural force—the force of gravity. I place the patient in such position as to allow all secretions to flow outward and downward out of the mouth or nose—the forward suspended sitting posture. A special chair is used, capable of attaining this position with all ages and sizes of patients. The operator's stool is quite low, so that the illumination from his head-lamp is directed well upward. The patient's body leans well forward, about the angle of 60°, the chin still further declined so that the oral axis is 45° or less. This obviates the necessity in sinus work of the post-nasal plug, and in tonsillectomy, of any swabbing or suction apparatus, and absolutely prevents blood inspiration when nitrous-oxid and oxygen is administered.

Hemorrhage is reduced to a negligible factor by the dull dissection and finger enucleation, no sharp instruments being employed. The tonsil is simply peeled out in its capsule. It has been demonstrated that the tonsilar vessels very rarely bleed, but that profuse hemorrhages usually come from the severance of vessels in the surrounding muscles by sharp dissection or cutting through tonsil tissue. Post-operative hemorrhage often is induced by wretching and straining from ether or chloroform nausea and vomiting, which we avoid.

The danger of shock in any surgical operation is proportionate to the character and duration of the operation and to the loss of blood.

This technic shortens the operative period to three minutes or less for the removal of both tonsils and adenoids; and sinus work is proportionately shortened and may be done thoroughly This is due to the perfect view which the operator has in this position; his field clear of blood, without waiting for sponging, no time lost between anesthetic periods as it is continuous, and both tonsils are removed at the same time by two sets of instruments.

The anesthetic is administered with equal facility in both nasal and oral operations, the process only being reversed. In some cases, a partial nasal obstruction renders the oral administration easier than nasal.

In nasal and sinus surgery a special mouth-inhaler is used; the gases being expired through the mouth; and in oral work both a small nasal inhaler and a mouth hook are simultaneously employed, whereby the gases can be forced with sufficient rapidity to induce anesthesia, preventing the inhalation of air through the open mouth.

425 Ohio Building.

ON THE ETIOLOGY OF SYSTEMIC INFECTION*

BY HENRY W. MORGAN, M.D., D.D.S., NASHVILLE, TENN.

IN MY ENDEAVOR to comply with the request of your Program Committee, and prepare a paper "On the Etiology of Systemic Infection", I found it necessary to do a great deal of reading. In the last few years an immense amount of writing has been done upon this subject. Dr. Black reported that in the review of three dental journals and one medical journal, he found fifty-eight articles published in one year. Many of those whom we hear speak of it, as well as those who have written about it, are inclined to indulge in expressions which leave the impression that it is something new. That this was an error I was quite confident, and was more impressed with it the more consideration I gave to "systemic infection." All dental writings, and particularly the work of the mouth hygienist for the last thirty years, have proclaimed that the condition of the mouth is the index to one's health.

The next discovery I made was that there is nothing mysterious about it. It's story in a nut shell is, "a lesion, septic infection of the parts affected by the lesion, a blood stream polluted and the entire system is exposed."

While the chief work of the dentist is to deal with the diseases that cause the loss of the tissues of the teeth, the teeth themselves, the gums and alveolar processes, the repair of the injury, their prevention and substitution, there is ever present with the faithful and conscientious dentist the more important question of their relation to the general system and possible bearing on the health of the individual.

The late Dr. W. D. Miller in 1891, in a preface to a series of articles on "The Human Mouth as a Focus of Infection" said: "During the last few years the conviction has grown continually stronger among physicians, as well as dentists, that the human mouth as a gathering-place and incubator of pathogenic germs performs a significant role in the production of varied disorders of the body, and that if many diseases whose origin is enveloped in mystery could be traced to their source, they would be found to have originated in the oral cavity."[1] He isolated fifty-eight varieties of micro-organisms from the mouth, many of which are pathogenic and many under favorable circumstances become so. These findings have been verified.

A paper by Dr. William Hunter, a surgeon, published in the *London Lancet*, January 14, 1911, aroused the medical and dental world to a realization of the true situation, by calling attention to the fact that the "foci in the mouth are in the same causal relation to arthritis, nephritis, cholecty-

[1] *Dental Cosmos*, September, page 986.

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*One of the symposium of papers on Focal Infection read before the Tennessee State Dental Society, June, 1916 litis, endocarditis, etc., as are infected tonsils or chronic suppurations in any other location." Dr. Hunter was especially severe in his denunciation of the habit of placing plates over infected roots, anchoring bridges to abscessed teeth, or teeth with inflamed and suppurating gums, or placing artificial crowns on such roots. He condemned the dentist for permitting chronic abscesses and other forms of chronic suppuration to remain in the mouth.

Dr. Hunter in this same paper says further: "In my clinical experience septic infection is without exception the most prevalent infection operating in medicine, and a most important and prevalent cause and complication of many medical diseases. Its ill effects are widespread and extend to all systems of the body. The relations between these effects and the sepsis that causes them are constantly overlooked, because the existence of the sepsis is itself overlooked; for the chief seat of that sepsis is the mouth; and the sepsis itself, when noted, is erroneously regarded as the result of various conditions of ill-health with which it is associated—not, as it really is, an important cause or complication.

"Sepsis in medicine therefore ranks, in my experience, as the most prevalent and potent infective disease in the body. It therefore deserves the particular attention of the whole profession as much as it has hitherto received their particular neglect. It requires this attention at the hands of every branch of the profession. * * *

"It is an all-important matter of sepsis and antisepsis that concerns every branch of the medical profession, and concerns very closely the public health. It is not a simple matter of 'neglect of the teeth' by the patient, as is so commonly stated, but one of neglect of a great infection by the profession—a great infective disease for which the patient is not primarily responsible any more than he is responsible for the contraction of typhoid fever or tuberculosis. The condition referred to is that to which I have given the name of 'oral sepsis.'

"The title 'oral sepsis' was first introduced into medical literature in a paper entitled, 'Oral Sepsis as a Cause of Disease.' (*British Medical Journal*, July, 1900.) My object in seeking for a special name, and after consideration in creating this one, was to emphasize the great fact that it is not the absence of teeth, but the presence of sepsis; that it is not dental defects, but septic effects; that it is not defective mastication, but the effective sepsis associated with such dental defects, or often present in conditions of gingivitis apart from such defects, that are responsible for the ill health associated with 'bad' mouths.

"The second object was to emphasize the importance of the infection caused by staphylococcal and streptococcal organisms, as distinguished from the purely saprophytic infections in which the mouth abounds; or the temporary presence of specific organisms—e. g., typhoid, tubercle, pneumonia, etc.

"The subject of 'oral sepsis,' as I designated and defined it—namely, the septic lesions of streptococcal and staphylococcal infection found in the mouth—belongs to no one department of medicine or surgery. It is common ground on which the general doctor, physician, or surgeon; the throat, nose, ear and eye specialist; specialists in children's diseases, in stomach diseases, in blood diseases, in rheumatic diseases, in fevers, in skin diseases, in nervous and mental diseases, and lastly, the dental surgeon, all meet on terms of equal responsibility. In its earliest manifestations no special knowledge is required to deal with it; a sound grasp of the principles underlying antisepsis alone is required. Unfortunately for the patient, it is precisely this grasp which I grieve to say is wanting.

"But, it is urged, the condition is so common that it is impossible either to prevent it or to deal with it successfully; further, the ill-effects are few and rare compared with the wide prevalence of the condition. As I originally showed (1900), and my further experience of the last ten years, supported by that of many others, fully demonstrates, the ill-effects are both common and grave. That they are not more common is due solely to the great resisting power possessed by the mucosa of the mouth and gums.

"This matter of oral sepsis is, therefore, of urgent importance in relation to the whole multifarious and widespread group of affections—medical, surgical and dental—caused by the actual presence and toxic action of pyogenic organisms (staphylococci and streptococci)."[2]

Speaking of the alveolar infection and diseases, Dr. Billings says they, "May be primary and due to unhygienic conditions of the mouth, and I am sure it is often intensified and prolonged by irrational dentistry, teeth with infected pulp, crowned or improperly filled. General malnutrition (scurvy, etc.,) may cause mouth infection, and alveolar disease. But whether primary or secondary, alveolar focal infection may be dominant in the production of systemic disease, of which malignant endocarditis (streptococcus viridans), chronic arthritis, and myositis are examples." From the infected alveoli and tooth canals bacterial cultures have been made.

In addition to staphylococci, a fusiform bacillus, the bacillus areogenes capsulatus, and various saprophytic organisms have been found. The streptococcus-pneumococcus group apparently comprise the most important pathogenic bacteria related to systemic disease.

You are all familiar with the work of Dr. E. C. Rosenow—and his convincing reports, presented in a paper entitled, "Bacteriology of Vasçular Infection," read before a joint meeting of the Chicago Surgical and Pathological Societies, on January 8, 1915. Dr. Rosenow reported the results of experiments on animals with pure cultures of streptococci. These were from cases of appendicitis, ulcers of the stomach, cholecystitis and arthritis in humans, and the injections were made into animals, mostly rabbits and dogs, usually into the ear or leg veins. Subsequent examination of the animals revealed the fact that the streptococci in a large majority of cases produced lesions in the animals in the same locations and of similar character to those in the person from whom the culture was obtained, for example:

[2] *Black's Dental Pathology*, page 399 to 401.

Fifty-nine animals were injected with fresh cultures from cases of appendicitis, and of these 41 were found to have developed inflammations of the appendix; while five showed either ulcer or hemorrhage of the stomach, one an inflammation of the gall bladder, 17 of joints, 13 of the endocardium, five of the myocardium, seven of muscles, four of kidneys, and four inflammations elsewhere in the intestines.

Seventy-nine animals were injected with fresh culture from ulcers of the stomach, and of these 47 were found to have developed hemorrhage of the stomach or duodenum, and 50 developed ulcers, while only two showed inflammation of the appendix, 20 of the gall bladder, three of the pancreas, 10 of joints, nine of endocardium, five of myocardium, five of kidneys, and seven lesions in the intestines.[3]

Dr. Billings reports that "in five patients suffering from Hodgkins disease, an alveolar abscess has culturally yielded to the diphtheroid bacillus, which is found in the enlarged lymph-glands in that disease"; and further asserts: "We know that systemic actinomycosis may arise from alveolar infection due to the ray fungus".

"Systemic disease due to a focus of infection anywhere, is probably always hematogenous. The study of infected tissues of experimentally inoculated animals and infected muscles, joint-tissues, lymph-nodes proximal to infected joints, nodes on tendons, etc., of patients, yield specific bacteria, and histologically there is found embolism of the small and terminal blood-vessels. Local hemorrhage and Endo-arterial proliferation result in interstitial over-growth, cartilaginous, osseous, vegetative and other morbid anatomical changes, dependent on the character of the tissue infected."[4]

From the writing of Dr. C. H. Mayo we learn that "It has taken a long time for the general public to appreciate the full role of infection in the production of death, while even in the medical profession more has come from the study of infection in the prevention of disease than in increasing means of cure of disease—great as has been the results of treatment."[5]

This same writer tells us that "It is only the resistance of healthy cells that prevents inroads of the myriads of ever-present bacteria and animal parasites which are striving to get a foothold that they may in turn carry on their life-work. Disease, then, is an inflammatory process from infection, and the efforts at repair. It may also be chronic from failure of the cell-life through lack of defense, from defective nutrition and advancing age." It is worthy to note, in passing, that he calls attention to the fact that "a comparatively small number of infections occur through wounds of the cutaneous surface;" that "Infections which produce the greatest number of diseases enter the system by way of the alimentary and respiratory tracts, and in the excretory ducts of the body lie the sources of the entrance of the organisms which terminate life in the majority of instances."

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[3] *Journal of Infectious Disease*, vol. 14, January, 1914, page 1.

[4] *Journal A. M. A.*, vol. 63, No. 23, page 2024–5.

[5] *The American Medical Association*, December 5, 1914, page 2025.

Dr. Black says of the organisms in the primary focus: "It is an interesting fact that, in all the cases of this group, the primary foci is a suppuration lesion, while the secondary systemic condition usually is not. It must be that the pus-producing organism in the primary focus does not produce the secondary lesion, or else the morphology of the organism is materially changed. If the pus-producing organism of the original focus is not changed, then the secondary manifestations are caused by a non-pyogenic organism which accompanies or follows the pus-producer into the original focus.

"The systemic lesion is generally the result of a hematogenous infection, and although the infecting organism may not be responsible for the primary focus, it may nevertheless gain access to the blood stream from such focus. The finding of the same organism in both lesions is not absolute proof that the primary focus is the real cause, or the only cause, as there may be other foci through which the same organism may enter the circulation.

"The saprophytic organisms never grow in living tissues, but only in the fluids which have been separated from living tissues. They decompose these fluids, and in the decomposition, products are formed which are poisonous and are absorbed into the general system. This has been called blood poisoning. Many examples of this occur in the fleshly foods eaten which have begun decomposition that is not noticed. The ingestion of such food will carry with it this poison and make the patient very sick for a time. In general theory its action is like a dose of poisonous medicine. It comes quickly and sharply, and if the patient survive its action, it gradually passes away—that is, when the poison is once expended it is done. This is generally spoken of as ptomain poisoning. But such an organism growing in pus that is being produced continuously will grow for a time, producing a systemic condition by a slow absorption of these products, which is often very serious. Therefore treatment may be for the prevention of these saprophytic growths, of their eradication when present, as well as for the cure of the pus-formation itself.

"In the mouth there are three groups of chronic foci: (1) Deposits of salivary calculus, with which may be included certain fillings, crowns, bridges, etc., which impinge on the gingivæ and keep them in a state of constant low-grade inflammation; (2) pus pockets alongside the roots; (3) chronic alveolar abscess.[6]"

The following quotations from Black's Pathology do not admit of any condensation and are, therefore, quoted in full:

"In the light of our present knowledge, we are justified in making the following summary of the relation of mouth foci to general systemic conditions:

"1. The mouth contains a large variety of micro-organisms, which may be divided into two groups; those which are normal or constantly present, and those occasionally or frequently found.

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[6] *Special Dental Pathology*, Black's, pages 405, 6 and 7.

"2. Conditions in the mouth are such that slight inflammation of the gingivæ are of frequent occurrence, being present in about ninety-five per cent. of mouths of adults.

"3. These slight inflammations, if untreated, may gradually progress to chronic suppurations. The suppurations are caused by organisms normal to the mouth.

"4. All organisms in the mouth, whether normal or accidental, have access to the blood stream through the soft granulations.

"5. The normal resistance tends to prevent systemic effects and is apparently successful in the large majority of cases.

"6. The transmission of infection from the primary focus is principally hematogenous.

"7. The primary focus is characterized by suppuration, while the secondary lesion is non-suppurative. Therefore the secondary lesion is not caused by the principal organism of the primary focus, but by other organisms which enter the primary focus with or after the pus-producer, and thus gain access to the circulation; or else the morphology of the pyogenic organism is changed if it produces the secondary lesion.

"8. The organisms entering the circulation through such foci appear to have an as yet unexplained tendency to locate in particular tissues.

"9. The secondary effects include a very wide range of conditions. Chronic arthritis, endocarditis, nephritis, cholecystitis, ulcers of the stomach, and appendicitis are the most frequent definite lesions. General impairment of health and vigor, with or without recognizable lesions, is common.

"10. The secondary effects are usually insidious in their onset and progress, and, when cases present to the physicians for treatment, are difficult of management.

"11. It is imperative that the primary foci be eliminated, regardless of the apparent systemic effect or lack of systemic effect.

"12. For the reason that the mouth contains the primary foci in the large majority of cases, a great opportunity is open to the dental profession to prevent grave systemic disease.[7]"

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[7] *Special Dental Pathology*, Black's, page 409.

To Remedy Marginal Imperfections in Inlays

Sometimes for good and sufficient reasons, it becomes necessary to seat an inlay that is good in every respect excepting a slight flaw or fault in one of the margins. This can very easily be fixed with a little gold foil. Have the surface of the inlay clean, grasp it firmly in a pair of tweezers, flux slightly and heat in a blue flame to a dull red. While at this heat a small pellet of uncondensed foil is stuck to the part of the margin that is shy. Then the inlay is placed in the cavity, allowing the foil to condense against the cavity wall. When the inlay has been seated with cement the margins will be without the former flaw.—*Practical Hints, Pacific Dental Gazette.*

THE EFFECTS OF FOCAL INFECTIONS ON HEART, KIDNEYS, LIVER AND OTHER ORGANS*

BY C. J. CARMICHAEL, M.D., KNOXVILLE, TENN.

THE PROFESSION of medicine enters into and touches every human activity from the first kindling of the vital flame until life's candle flickers out. The joys of being and the sorrows of life, the travail of labor and the relaxations of idleness, the opulence of riches and the meagerness of poverty, have running through their web and woof the fine blue thread of the calling which has as its ideal the physical salvation of mankind.

Creeping into the lives of men everywhere is the thought that co-operation is better than competition—we need one another and by giving much we will receive much. Hence, it is my purpose to add not so much as I would, but so much as I can, in the short time allotted me on this program. My acceptance and response to your very kind invitation to take part in this symposium is acknowledgment of the appreciation of myself and co-workers in the general field of regular medicine.

At first thought one is apt to consider focal infections as a comparatively recent field of investigation; but if one will only remember that almost any infections are focal in the beginning and soon become systemic through entrance of infective agents or by-products into the circulation, one will begin to realize that the supposedly new field is merely a continuation or expansion of the knowledge now several decades old.

As an illustration of infective agents becoming systemic we have endocarditis, generalized tuberculosis, septecopyemia, gonorrhea and arthritis.

It is however, only during very recent time that the association of many of these general systemic conditions have been traced to focal infection often apparently insignificant. It is this apparent smallness and insignificance which has obscured the cause. The human mind attaches the greatest importance to that class of phenomena which most strongly affects the special senses. Many of the really vital and all-important symptoms are so subtle and so slight that the most careful investigation is necessary for their detection, whereas a large abscess, an abscessed tooth, an infected wound, will thrust itself upon our attention. A slightly discharging ear, an almost undetectable infection at the root of a tooth, an apparently mild catarrh, an infected ingrowing nail may ultimately bring about systemic changes that are irreparable. What human being, if he or she knew positively that an abscessed tooth or an ingrowing nail would result in diseased heart, liver, kidney, gall-bladder or appendix, but would consult a physician immediately?

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*One of the symposium of papers on Focal Infection read before the Tennessee State Dental Society, June, 1916.

If physicians will learn to attach significance to small affections as well as patent, gross conditions, much ultimately serious disease may be averted. That a myocarditis or endocarditis may be and usually is a serious condition, demands more than ordinary care and treatment to effect a cure, none can gainsay. That one infected kidney may and does result either directly or indirectly in death or chronic invalidism, none can gainsay. That a metastatic abscess of brain or liver is almost beyond the reach of our skill at the present time will not be disputed by many; and yet we know that these serious conditions are brought about as a result of small foci of infection.

The streptococci in the focus of infection apparently attain specific pathogenic qualities, with affinity for joint tissues, kidneys, muscles, including heart muscle, gastro-intestinal mucosa, gall-bladder, lung, etc., respectively. The pathogenic organisms pass through the blood-stream and lodge in the arterioles and capillaries of the organ or tissues as embolic masses, small hemorrhages result, in the heart valves, muscles, mucosa of stomach, gall-bladder, kidney, etc. As a result of the embolism and hemorrhages, characteristic changes occur in the affected tissues and elsewhere in the body. In many of the cases the infection is absorbed very slowly and the long-continued course of the infection completely exhausts the antibodies of the system.

Infected voluntary muscles and tendons become tender, painful and eventually result in deformity due to contraction. Hemorrhage of mucous membrane of stomach, as result of septic emboli, results in ulceration and becomes a surgical condition and a menace to life.

Infection of gall-bladder results in acute or chronic cholesystitis with gall stones, also a surgical condition which only too often results in disaster. It requires little theoretical reasoning to see what the result of a few months' absorption or metastasis of these infections may be on the blood and blood-making organs.

To say that a patient is anemic and needs iron or arsenic is not sufficient; perhaps the extraction of a tooth or the removal of a tonsil would be more scientific and reflect more credit on the medical adviser. In a discussion of this subject, reason demands mention of infected bones and joints in children. That many of these can be prevented and many children who would be hopelessly crippled for life, be relieved of a handicap, none can disprove.

Perhaps the most common result of focal infection is acute rheumatic fever or the arthritis. That acute rheumatic fever is due to a focal infection is now a conceded fact. The economic loss in wages, aside from the physical suffering, doctors' fee, and attendance upon those helpless individuals is an important item. Added to this is the fact that 50% of all individuals who suffer an attack of rheumatism develop diseased hearts as a result of the infection. A negligible per cent. of the diseased hearts recover to such an extent that patient can perform his or her life work in comfort and compete with normal individuals in earning livelihood. Few sadder pictures to be seen than a splendid intellectual shrewd business man who has been stricken down in the prime of life with rheumatism, resulting in stiff and contracted joints, diseased heart and muscles and a broken spirit and ambition. And it is the more sad because it resulted from such an apparently insignificant source and mayhap a preventable condition simply by the detection and destruction of the infection while yet focal.

The clinical picture of an individual bedridden, previously perfectly healthy, burning up as cause of high temperature, suffering pain so extremely severe that he cannot stand a slight jarring of bed, cannot even turn himself over, miserably uncomfortable as a result of profuse acid sweats, which add to his prostration, red swollen joints, mental depression, loss of weight, and as before stated every other one or 50% developing a diseased heart, looking forward to a slow convalescence with perhaps joints stiffened and contracted, with a disposition to recurrence, such a picture should convince anyone of the extreme importance of attending to the smallest focus of infection, for who can tell but that it may be the cause of just such an attack of arthritis?

The arthritis having developed we are in a degree powerless. Up to the present time we have no specific remedy for rheumatism, not even that which will relieve the terrible pains without doing harm with the remedy. You may ask why is this? The infection which has gotten into the circulation and lodged in a foreign tissue, there to develop and elaborate toxins, has, according to Rosenow, undergone a mutation: i. e., the new home, new food, more, or less, oxygen and other factors so changes the bacterium that it is a different organism and elaborates a different toxin. It is for this reason that a so-called autogenous vaccine so often fails to give results expected. While believing as I do today that vaccines are not specific, I would not decry work and investigation along lines which still conform to present trend of scientific thought. I believe the dentist should have cultures made from old abscesses particularly if the patient gives a history of ill health. This culture may later prove of inestimable value in treating some of the complications of systemic nature. Again I think a differential blood-count might be valuable to the dentist who cannot quite decide whether he has infection or not, and particularly if he cannot take advantage of X-ray or if the abscess is too small to show in X-ray plate.

CONCLUSIONS:

1. An apparently insignificant focal infection may produce an arthritis, a diseased heart, an abscess in liver, brain or kidney, a diseased bone, a destruction of blood and blood-making organs, any of which may and too often do, result in death.

2. The damage to these various organs and tissues entails undue physical suffering and risk of life, leaving a diseased organ or tissue for life. This damage only too often is irreparable by any means in hands of medical science.

3. Systemic infection having occurred and the focus having been destroyed or covered up, the diagnosis of the patient's condition never may be made.

4. A large percentage of the cases of systemic involvement can be prevented by conscientious scientific work and co-operation on the part of physicians, dentists and patient.

5. Vaccines can be depended upon to do only what they can do, no more and no less. They are not specific.

6. A laboratory should be maintained by the medical and dental profession where cultures of foci of infection could be made and vaccines be prepared, if need be.

7. A record of every case of every kind, everywhere, should be kept by every man, medical or dental.

CLINICAL DIAGNOSIS*

BY R. B. BOGLE, M.D., D.D.S., NASHVILLE, TENN.

DR. MORGAN has given us a very beautiful discussion on the etiology, and I am sorry that he did not have the clinical diagnosis tacked on to that, because I am very sure, from the way he handled his subject, he could have handled that very beautifully and most advantageously to us. In considering the clinical diagnosis, I take along with that the suggestion that I am going to give on the X-ray diagnosis, because they go hand in hand. A man who attempts to do an X-ray diagnosis on any diseased condition without taking into consideration the clinical diagnosis, often makes a failure for the reason that he is not sure of his ground. We must understand some of the pathology underlying the conditions before we can give a proper reading of the radiograph. Another thing we must know is to be able to read correctly a condition of health, versus a condition of disease. We must know what a healthy tissue is before we can tell in what respect there is a diseased condition. It is therefore necessary for us to know by comparison anything differing from the normal, which would be abnormal. We also take into consideration what we find microscopically. We must in many instances go into a microscopic examination; even after we have done all we can do in the way of making a positive diagnosis, we must then go into a pathological diagnosis and finish that up. Your findings will be the same under the radiograph, whatever your clinical findings are;

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*One of the symposium of papers on Focal Infection read before the Tennessee State Dental Society, June, 1916.

that is, the conditions as interpreted from the radiograph will be the same. But we find variations of that in various types of diseases and infection.

One thing I might mention in that connection is this: Very frequently we cannot make a positive diagnosis on account of large obstruction of bony tissue, and we do not understand why the primary infection should have been present at this root under or around the alveolar process. In many instances we find some rare type of infection which is established by microscopical examination, and so find out from that type of infection just the specific which is cleared up by that type.

Now, as to the making of radiographs, the denser the part the deeper will be the shadow thrown on the film, and consequently the more transparent the negative in that region. Thus, in the negative, metal fillings, posts and metal crowns appear as transparent areas; gutta percha, cement, enamel and porcelain, a little less transparent. Then in the order of their respective densities come the dentin, bone, gum, and lastly the cheek appears, when it is shown in the negative at all. The contrast between the diseased tooth and the bone tissue is very marked. Unfilled canals and pulp chambers appear as dark streaks and areas in the tooth. Filled canals and pulp chambers appear light; that is, provided the substance used in filling those canals and pulp chambers is some substance that will check the ray.

Root canals sometimes are not filled at all. I would say, be very careful in taking any man's word for it, that any root canal has been properly filled. Look for trouble. Gutta percha will usually check the ray, unless there is such a small part of it incorporated in some type of filling material as to render it less light in the radiograph, but so also do we find that in radiographing some of the root-canal fillings, for instance, the type of material that Dr. Callahan uses. He incorporates with his solution of rosin a sufficient amount of bismuth to give him the color, so that when the root canal is filled and radiographed you cannot say whether or not you have succeeded in going to the end of the root, if you had not taken your radiograph before. Now, pulp stones appear as light spots in the dark body of the pulp chamber or canal. Sometimes we are able to make a diagnosis if calcium degeneration has gone to any great degree. We have, however, as a rule preceding calcium degeneration some form of irritation that is responsible for that. Abscess cavities appear as dark areas. It is easy to distinguish enamel from dentin, and the peridental membrane can clearly be seen as a dark streak following the antrum of the roots, varying of course according to the thickness of the membrane in different individuals and different conditions. We sometimes find in making radiographs that one radiograph does not show any membrane at all. The next one you make may show it entirely and show it beautifully, due to the fact that your position has been entirely changed, so that the ray goes through.

A bit of calculus in the peridental membrane, if it can be seen at all, will appear as a light spot. This calculus, of course, must be on the distal side of the root to be seen. If any trouble exists or is present at the root end, we determine that the tissues are affected or not affected, according to the degree of density. In pyorrhea we frequently find the destruction of large areas of the process, and not infrequently it involves a large amount of osseous tissue as well. In making an X-ray diagnosis we sometimes have to differentiate between an alveolar abscess and pyorrhea trouble. Sometimes we find that we may have a destruction of pulp tissue, which primarily would not mean any disease or presence of pyorrhea conditions. If we find rarefied areas at the end of root canals, naturally we conclude that by comparison with the healthy tissue there is some pathology present. It does not mean that the rarefied area means the loss of teeth.

There is a type of treatment by which we use an electric current, forcing medication through the end of the root, through the canal into this area, and we have seen some beautiful results that have been recorded by this method. Possibly Dr. Callahan can give us some idea as to what is being done in that line at the present time. Whether or not we are able to save a good per cent. of those cases by that type of treatment, I am not prepared to say.

One of the places in which we find a great deal of trouble is what has been referred to by Dr. Morgan. He mentioned the ill-fitting crown and the over-hanging crown, ill-finished or not-finished-at-all fillings of the gingival, which often are responsible for the beginning of trouble, and in some instances the examination does not reveal the type of destruction and the amount of destruction that is revealed after a radiograph has been made. You will find sometimes, too, that focal infections are present, of which there is no evidence so far as an examination of the mouth goes, without the aid of the radiograph, and particularly is this true where there is extensive bridge work, and where we have large fillings or crowns in the posterior teeth.

It is said by some that the X-ray enlarges and magnifies conditions. That sometimes is because they have not the knowledge of what the X-ray offers, or what it does, in the way of aiding us. And also sometimes we find that a false diagnosis is made with the radiograph, or with the X-ray, and for that reason it behooves us to be more careful in our study, in our interpretation of those radiographs. Now lastly, the X-ray is not infallible. Sometimes we think we have a diagnosis made, but it is necessary for us to make a series of radiographs, and make one conform with the other. Sometimes we find conditions when a second radiograph does not conform with the first, and we must make others from different angles and go thoroughly into a clinical examination before we make up our mind finally as to the proper diagnosis. It means a closer association of the two to be correct, namely, the clinical diagnosis in connection with the X-ray diagnosis, which often makes it possible to find some of the hidden regions that are so largely responsible for the trouble in the human race.

TREATMENT AND PROGNOSIS OF ORAL FOCAL INFECTIONS*

BY CELIA RICH, D.D.S., NASHVILLE TENN.

THE SERIES of papers immediately preceding this, as well as recent research by special workers, has brought out so clearly and incontrovertibly the wide prevalence of oral infections as causative factors in systemic diseases that it only remains for me to go at once into the treatment of these foci, assuming their presence and significance to be established.

In a general way, we may say that the first procedure should always be the elimination of the source or sources of infection, but I want to go back a step farther, for, inasmuch as these areas can in many cases if not in *most*, be reduced to health only by the removal of the teeth involved, and realizing that even this radical procedure and the entire obliteration of the primary focus of infection cannot restore to its original functional value an impaired heart-valve or a deformed joint, I wish first of all to emphasize the value, here as elsewhere, or rather here even *more* than elsewhere, of prophylaxis.

Let us see then what can be done towards preventing these conditions. If we accept the teachings of many of the best workers in the field of bacteriology the baneful streptococcus is ever present and awaits only the finding of a comfortable habitat in which and from which to conduct his evil business. Areas of low vital resistance permit the entrance and establishment of colonies of these bacteria, and the mouth offering ideal conditions for bacterial growth, whenever we reduce the vital resistance of any of the oral tissues we more than accentuate an already cordial invitation to these undesirable visitors.

In the two groups of chronic infective foci with which we as dentists are principally concerned, the alveolar abscess and the so-called pyorrheal pocket, the principal tissue involved is the pericementum; our prophylaxis then should be directed towards preserving the health and vitality of this tissue.

Maintenance of general mouth hygiene goes almost without saying, and this applies not only to the patient's care of the mouth but to the character of dental work as already referred to by Drs. Morgan and Bogle; that is to the manner of constructing bridges and crowns, the condition of the cervical portions of our fillings, the preservation of correct interproximal spaces etc. These things, properly attended to, *will do away with all the cases of pyorrheal origin* in which this disease is due wholly to local conditions;

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*One of the symposium of papers on Focal Infection read before the Tennessee State Dental Society, June, 1916.

that is, the vast majority of cases of pyorrhea. Where this disease is, in itself, the product of systemic condition of whatever kind, the mouth ceases to be the primary seat of the disease and the prophylaxis rests properly with the internist.

In the writer's opinion, the greater importance of the role of pyorrhea as mentioned by many, in producing secondary lesions, is due to the frequency of the disease rather than to its greater virulence over periapical infections. The infective material is here present in open pockets instead of under the pressure present in apical abscesses, and the products of the disease instead of being absorbed entirely by the blood and lymph, are largely taken care of by the much-abused but nevertheless highly resistant alimentary canal. However, these pyorrheal pockets do form partially protected locations for the greater ease of bacterial proliferation; and if the investigations of Hartzell are confirmed, as seems probable, there is at the base of every gum crevice some fault in the endothelium, which permits easy access of infections into deeper tissues; and when the pyorrheal disease has reached the root apex, we have, in my opinion, the most hopeless type of case—the one for which extraction is always the treatment; or amputation if the tooth be multi-rooted.

We cannot go into the treatment of pyorrhea in this short paper; but every scientific means known should be used to obliterate these pockets, and failing of success to overcome the obvious infection, teeth should be removed, (I mean "obvious" by every means known of viewing the tissues).

We now come to a consideration of the other and probably more significant class of cases known as apical abscesses—and of these the blind abscess plays much the more important role in systemic disease; in fact, in some cases of the freely-flowing fistulous type comparatively little virulence can be demonstrated in the bacteria isolated; and instead of the streptococcus in its various forms, often the staphylococcus seems to be present—not that this bacterium is to be lightly overlooked, but by the side of the heart-, kidney-, joint-, and muscle-lesions of the streptococcus forms, his activities are mild so far as yet known.

If we can do much in prophylactic treatment of pyorrhea, we can and should do even more towards preventing apical infections. We have regarded too lightly the extirpation of pulps. By so doing we produce in a singularly exact way, ideal conditions for bacterial invasion. To quote Dr. Grieves: "The dangers from pulp removal are many at best. First, the production of a minute periapical tissue-necrosis of which the dentist is not aware. Second, the infection of that area which has lost its resistance by his processes. Third, if he succeed in closing it without infection, the final arrival, by hematogenous convoy, of micro-organisms, often of the non-virulent type, which may lodge thereon, become adapted and raised in virulence due to the media furnished, and propagate so rapidly as to form a really dangerous infective *nidus*." These are dangers which lie in every case of pulp removal; and when we add to them the increased liability to the invasion of bacteria' induced by our careless instrumentation and indiscriminate use of such drugs as arsenic, for pulp devitalization, and formocresol, strong cresol, phenol and other germicidal, oxidizing, destructive agents in the root canal, we have a considerable number of "dont's" to refer to in preventing possible after-troubles where pulp removal is necessary.

Our treatment should begin with the avoidance in every possible case of the removal of pulps—often an inlay can be made instead of a crown. Even in the anterior teeth, procelain shells can often be substituted for pivot crowns, or gold inlays constructed with enamel facings and the pulps thus conserved.

Since it has been pointed out and explained that even in the cases where most accurate root fillings have been made, infected periapical areas often result, we should take warning and redouble our efforts, not only to maintain asepsis all through our procedures, but also to use common sense in dealing with the still *vital* tissues beyond the foramen. I refer of course to the pericementum, and moderation in the use of powerful medicaments as well as avoidance of traumatic injury to this tissue. Dr. Callahan has shown us graphically the best way to treat pulpless teeth, and a close adherence to his technic will save both patients and dentist much subsequent trouble.

This paper, as you know, was to deal with prognosis as well as treatment; and it is because the prognosis is very favorable in a great many of these cases that I have deemed it permissible to devote so much time to the consideration of the prevention of the primary lesion. Given a case in which careful diagnosis by X-ray, confirmed by clinical manifestations, has established the presence of an infected area around one or more teeth, the treatment should depend on the conditions in the particular case—often the canal has never been opened, sometimes the canal filling is imperfect, again a pyorrheal pocket may have extended to the apex.

The importance of the lesion does not depend on its extent so much as on the virulence of the infection; we must therefore consider all periapical lesions with suspicion. If possible obliterate the infection by the usual methods of cleansing, sterilization and refilling, but where a portion of the root has already been denuded, the apex of the tooth must always be sacrificed, if not the tooth itself, and either followed by thorough curetting. Whenever one of these suspicious teeth is allowed to remain in the mouth after treatment, it should be considered to be merely on probation, and it is our duty to make frequent observations as to its condition; and if any evidence of reinfection occurs, "if the tooth should go lame or feel long for even a short period, particularly before use in the morning, or become sensitive to heat or pressure, if the alveolar wall over the apices becomes sensitive to pressure or lacks the normal bone ring in percussion," it should be opened and treated, or in case of recurrence of systemic conditions, extracted. Unfortunately, we know very little about just how the tissues are adjusted after periapical infection and can only guess at how little any known treatment accomplishes. Much is expected of ionic medication, but with the emetin theory for pyorrheal treatment already discredited, and specific vaccine therapy in danger of being superseded by simpler proteid substances, our faith in new remedies is not what it once was.

It seems that we never can be sure, no matter how careful or skillful our surgery, that there will not be recurrence of the infection (by hematogenous path, probably) with a renewal of the general symptoms. For this reason, we cannot be altogether at variance with those radicals who advise extraction in all cases where rarefied or infected areas are found to exist about teeth. I know of nothing that requires nicer discrimination than is necessary to determine just when the condition of the tooth is within the realm of possible cure and when it positively should be condemned. If there is one class of cases for which I should always say extract, it is those in which the infected area is at the apex of a posterior tooth which has considerable movement in its socket in an up and down direction. Such a tooth acts as a veritable pump to force sepsis into the surrounding tissues. Lower third molars, too, are especially good subjects for extraction, since their roots lie in close proximity to the large blood vessels and lymphatics in the neighborhood of the angle of the jaw.

We have been accused, as dentists, of regarding the loss of a tooth as the internist does the death of an individual; and in this we often have the support of our patient; but while it is not an exaggeration to say that the dentist, in saving certain teeth, condemns his patient to a living death, we must not overlook the evils resulting from interference with mastication caused by the loss of teeth—and if physicians could be made to realize the difficulty of getting artificial substitutes for teeth, sacrificed sometimes on the barest possibility of being responsible for a remote disorder, they would go more slowly in this direction. However, I should like to urge the co-operation of the dentist with the physician in these cases, and a proper acceptance of our responsibility in them. No narrow egotism or desire to gloss over his faulty technic will prevent the conscientious dentist from seeking honestly to find and remove the oral foci of infections, wherever present; remembering that in a serious case, if dental sepsis be present and the report of the dentist be negative, important vital organs may be damaged beyond repair.

We will be astonished and gratified in many cases at the rapid clearing up of severe systemic lesions after correct oral treatment. On the other hand, we need not consider the sacrifice vain when these conditions do not yield immediately to local treatment. Dr. Billings has said: "A very long time may elapse after blotting out every focal nidus present before, with every known means, the general resistance may be raised to the point of disposing of the products of such general infections." We have but to consider the slow reparative forces in alveolar tissue, especially after certain types of streptococcus invasion, to appreciate how slow indeed must be the resolution to anything like normal, of a remote joint lesion.

In severe and long-standing arthritic cases, any treatment of the primary focus, however radical, will have to be supplemented by long-continued general care. Plenty of rest, fresh air, nourishing food, freedom from care and responsibility, accompanied by persistent scientific massage, will eventually restore many such cases. This general treatment, however, belongs properly to the realm of the physician.

In conclusion, I wish to explain my failure to go more into the detail of the treatment, as well as my apparent total disregard of the role of sinus and gland infections, on the score of lack of time, and to emphasize once more, even at the risk of boring you with repetition, first, the necessity of our graceful acceptance of the great responsibility which these systemic involvements have thrust upon us, which means more careful study of the anatomy and physiology of the entire body; second, the importance of proper mouth hygiene; third, the preservation of the dental pulp; and fourth, a rational scientific regard for the vitality of the periapical tissues even after pulp removal.

DISCUSSION ON SYMPOSIUM.

Dr. C. W. Hoffer, Nashville: I feel that I have a man's job in discussing these papers which we have heard this morning, and I am but a boy. Our friend Dr. Morgan has given us a paper which is very scientific, and his idea of focal infection, as stated in his paper, and the way the infection is carried into the tissues and distributed to the different organs, is very interesting.

I was very glad to hear Dr. Bogle's paper, which was most excellent and instructive. He brings out the different diagnoses by the use of the X-ray, and that it also has something to do with the clinical diagnosis. I think that very little can be done in X-ray work, as Dr. Bogle has said, if we do not take into consideration at first a very careful clinical diagnosis of the surrounding tissues. He brought out in his talk the different thicknesses and shadows of the X-ray and explained a great deal better than I can about differentiation of tissues that come before us in X-ray work. Also that we can find conditions of fillings and crowns, and pus pockets, and the condition of the ends of the roots, by X-ray, which are difficult to find in any clinical diagnosis.

Dr. Carmichael gave us instances of toxin. I believe the Doctor mentioned that the toxin had as much to do with the different disturbances as the germs themselves. I was very glad to hear that in his paper. I knew that we got some toxin infections, but not to the great extent that he brought out in his paper.

Dr. Rich has a paper that has of course such a field to cover that it is hard to tell just where to start, and she handled it so beautifully that I feel there is no part for me to take up and emphasize or bring out more clearly than she has brought it before us. Blind abscess treatment, I think, is one of the things that come under that head. They are very hard to treat, and I think our friend, Dr. Callahan, has helped us wonderfully at this meeting in showing us how to take care of them.

Dr. J. R. Callahan, Cincinnati: I think it is proper that I should take advantage of this opportunity to thank you for the many courtesies extended to me during my visit here. I am sure you have done everything you could do. I enjoyed this symposium very much. I like the way our medical friend puts his side of the question. I am associated with the medical staff of the hospital at home, and I find that those gentlemen are right up on the firing line, and they know exactly what they are talking about, and we are trying to show that we know particularly what we are trying to do. I wish to compliment Dr. Rich also on her most excellent paper.

I think it is absolutely necessary that the dentist be able to recognize the physical condition of the patient more thoroughly than we have been doing in the past, and how we are going to do that I do not know, unless we go to the hospital and take our hospital training along with the medical men. Not that we want to treat those diseases, but it is our duty to recognize the conditions. There is more to be said along that line, and particularly is it necessary to recognize the resistance—what would be the resistance of a certain patient under certain conditions, etc. We must determine the power of resistance of the patient.

Now, as to the selective ability of micro-organisms, etc. This is a very broad and deep question, which is being studied thoroughly by some men. They have not arrived at any very definite conclusion, but we are arriving at conclusions that point to a result. We may know some day why, for instance, a living germ insists upon lodging in the mucous membrane, and so on down the line. We do not know that yet. Every little while you all know a wave comes over the dental profession of an idea that we have got to go and purchase some very expensive instruments, in order to produce certain desirable results. The ionic treatment is yet in its infancy. I do not believe I would advise the dentist to go and spend $200 for an instrument for that treatment, until it is better understood. It looks good. I am using the treatment all of the time, but I am not prepared to say that it will not go the way of some other methods of the past which have been discarded. I do not know about that. We are carrying on experiments in pathological institutes from which I hope in a year or so we can give a more definite answer on that. I thank you.

Dr. C. E. Byington, Chattanooga: These essays have been excellently presented to us this morning. There are some things that possibly should be emphasized. Until very recently, possibly, has the medical profession preached more than we, that much of the bacteria was eliminated by the gastric juices, or entirely. We now find that that is not the case. Much absorption of pus is taking place. It is really being carried into the system, and there is a lack of eliminating power of the gastric juices. I want to say though, that I think the dental profession should work more in harmony with the medical profession, and the medical profession more in harmony with the dental profession to this end. I think they are beginning to appreciate our profession more, and we in turn should appreciate them, as we always have, and take them into our counsel in these difficult cases; and whenever a case becomes so serious that the patient has fever, as the result of toxic condition, and it becomes necessary to resort to vaccine treatment, we should not assume the entire responsibility of the case, but let us take the family physician in consultation and treat the patient together. I say let us share the responsibility, and in this manner, by working with the physician, you have the means of serving your clientele better and promoting harmony which should exist more than it does today.

Dr. Henry W. Morgan: I have nothing in the world to say, except to express my very great delight in hearing the three papers, and especially the one of Dr. Carmichael. Especially do I endorse the idea of a hearty co-operation in the laboratories, in which the physician and the dentist should collaborate with one another. In the forty years I have been in the practice of dentistry there always has been the heartiest co-operation between my medical brethren and myself; and I often have wondered why it is that we are constantly hearing the expression that we ought to begin it. It began forty years ago with me, and it began by just the manifestation of what the previous gentleman suggested here—my belief that there was a field that they presided over, which did not belong to me. A gentleman not long ago in presenting a bridal present to a young lady wrote in the back of the book, "The only love you keep is that which you give." The only co-operation that you ever have with the medical profession will come when you begin to lean on the medical profession for help and assistance. If you manifest the slightest inclination towards that sort of a partnership, you will find the medical man will meet you more than half way every time.

Dr. C. J. Carmichael, Knoxville: This is a great pleasure to me. I would like to say that there are a few men in the practice of internal medicine in Knoxville who do not consider the treatment of their patients complete until a dentist has gone over their teeth. (Applause)

Experience bears out the fact that that is well worth while. We have a great many X-ray plate^s made of teeth. We go so far as to have a differential blood-count made, when the X-ray cannot show it and the dentist cannot detect it, and we feel in doing this that we are doing nothing more than our scientific duty. I do not know anything about dentistry, except I know that these focal infections play a great part in our work in internal medicine, particularly in diseases of the kidney and heart. But I believe that the dentists who have these diseased teeth to deal with will do well never to fill a tooth until they have raised that patient's physiological condition to the highest state it is possible to raise it. In other words, when you have raised them physiologically until they have sufficient resistance to take care of any infection that you have not been able to destroy. So I believe you should not try to fill a diseased cavity until you get the patient up to the hghest physiological standard.

Dr. Celia Rich, Nashville: I wish only to emphasize one point in the treatment brought out by Dr. Callahan, one of great importance in cases where there are a number of foci of infection as in a case of pyorrhea involving many teeth. It is very unwise if not dangerous to attempt to treat many of these teeth at one sitting on account of the reaction. Pneumonia and other systemic infections have resulted from the too radical treatment of cases of this kind, and often the treatment of only a few teeth is enough to put a patient in bed.

THE DENTAL PHASE OF HEALTH CONSERVATION*

BY HOMER C. BROWN, D.D.S., COLUMBUS, OHIO.

IT IS AN HONOR to be invited to present a paper before the physicians or the dentists of Youngstown. It is a greater honor to meet with both professions under the agreeable conditions of banqueting together and discussing some of the questions which should be beneficial to both ourselves and our clientele.

For some years I have appreciated the interdependence of the physician and the dentist, and have recognized that the best interests of all would be conserved by the closer co-operation of these professions, since their efforts in the conservation of health are intimately related. I have consistently "preached" and "practiced" this co-operation, and am quite naturally interested in the gradually increasing evidence that this procedure may soon become more generally established.

Further, such meetings as this do much good in many ways. The physician becomes better acquainted with the physicians of his community, and the dentist becomes better acquainted with his fellow practitioners. Also, the two professions are brought in closer touch in a way that should be distinctly advantageous.

In this connection, it may not be out of place to briefly quote from my address as president of the Ohio State Dental Society, in 1907, as follows:

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*Read before the Corydon Palmer Dental Society, at Youngstown, Ohio, 1916.

"Generally speaking, the medical profession has begun only recently to look to the mouth and teeth as sources of some of the pathological conditions which they are called upon to treat, and we should be ever ready to co-operate with them in correcting such conditions, as well as in other matters of mutual interest to both professions and to the public. It certainly is appropriate for our local, state and national organizations to invite the general medical practitioner, the specialist or the surgeon to contribute to our programs; and, with some modesty, we say that similar medical organizations might well consider the advisability of inviting the general dental practitioner, the orthodontist or the prophylaxist to participate in their programs. I am impressed with the conviction that such interchange of ideas and courtesies cannot fail to be of mutual interest to all."

Society can be divided very properly into two classes, producers and non-producers. The prosperity and happiness of a community, state or nation can be gauged very safely by the percentage of producing units, while the liability in either instance is largely regulated by the percentage of non-producers. Therefore, health conservation becomes a very important factor in our social and economic problems, and it merits the best thought and support of all progressive citizens.

Disease formerly was recognized as a question for individual concern, or at least not extending far beyond the limits of any particular family; but in the face of present-day information, together with a broad humanitarian policy, disease is now considered a question wherein the interests of the community are involved. Thus it becomes the privilege of many, and should become the duty of all others, to stimulate a high standard of public health.

In establishing and maintaining a high standard of health it is imperative that the emphasis be placed upon the "prevention" of disease rather than its "cure." It is to the credit of the medical profession that it always has been commended for its efforts in behalf of the prevention of disease, and the elimination of pain, regardless of any remunerative consideration. There is no doubt in my mind that the practitioners of medicine, in the various specialties, render more charity service than all the other professions combined.

The teaching and practice of the physician always will keep him, and rightly so, in the forefront in everything that tends to relieve suffering and improve health conditions. Closely allied to him is the dentist, whose limited field of operation only recently has been viewed as having any direct relation to systemic disturbances. Within the confines of the generally recognized limited province of the dentist, are to be found areas of infection which, a few years ago, would have received not even a passing notice, while today the attention of the professions and the laymen is directed to the detrimental influence of faulty mouth conditions.

Therefore, the dentist must assume his rightful responsibilities and discharge his full duties in this health-conservation movement.

Some of the most essential adjuncts in connection with the prevention of disease are as follows:

Preventive medicine, preventive dentistry, the administration of health laws and regulations by competent authorities, the co-operation of the school authorities and other public officials, and last but not least, the moral and financial support of an appreciative public.

In line with this argument, we are justified in stating that health may, to a more or less degree, be compared to a purchasable commodity; and whatever expense is necessary to safeguard it should be unstintingly furnished, let it be by the individual or by the public.

Never before has individual efficiency counted for more than it does today, and the "handwriting on the wall" strongly indicates that the future will offer increased opportunities for those thoroughly equipped to take advantage of them and discharge the full responsibility in connection therewith. In order to develop and maintain the highest possible efficiency it is necessary that the individual be equipped to thoroughly masticate his food, as well as to have a healthy mouth-condition generally. Any deviation from this will, sooner or later, show its detrimental effect by a gradual lessening of the individual resistance.

In order more clearly to show a dental relation to systemic diseases, it is my purpose to point out and more positively establish, if necessary, the fact that there is, either directly or indirectly, a dental aspect to all questions having for their purpose the conservation of health. In doing this some of the pathological oral conditions which may be responsible, either directly, indirectly or as contributory factors, for many of the systemic infections, will be considered. However, in following this procedure, or in presenting this paper, I am not assuming that any of you do not give full consideration to the presence and influence of such conditions. On the other hand, by reviewing and confirming our observations, we further strengthen our convictions in many of the complicated cases of obscure origin, thus better equipping ourselves to give those who seek our services the benefit of generally-recognized treatment.

Some of the pathological oral conditions to which I refer are as follows:

First: We must recognize that pyogenic micro-organisms are present abundantly in an unhygienic mouth, even though this condition may result only from lack of proper use and care of the teeth and mouth. By proper use we refer to the function of the teeth and contiguous tissues, since they, like all other organs of the body, have their normal functions. The one important function of the teeth is the thorough mastication of food. This not only prepares the food for the first and most important step in digestion, but it tends largely to keep the teeth and tissues of the mouth in a healthy condition. A century ago the mastication of food required a more vigorous exercise of the organs and tissues involved that it does today and, as a result, better mouth conditions prevailed. As civilization has advanced, and preparation of food has so greatly changed, we are forced to resort to artificial means of brushing and cleansing the teeth and gums, as well as treating increased diseased conditions and correcting others resulting from defects and destructive processes. This is brought about chiefly by what may be termed disuse, or lack of proper exercise of these organs.

Second: Carious teeth, abscessed teeth, constantly discharging pus into the mouth, and various inflammatory stages of the gums up to and including pyorrhea alveolaris. Under such conditions, thorough mastication is impossible. The muscular action in attempted mastication, together with the contact of morsels of food, forces purulent matter from pyorrhea pockets and discharging abscesses, thus contaminating the foods. Similar action produces like results by forcing various forms of micro-organisms from the interproximal spaces between the teeth. Such micro-organisms are transported naturally into the stomach, and many of these are not destroyed by the gastric secretions, but are carried on into the intestines and frequently produce some form of intestinal disturbance.

In this connection, I need only take time to state that dental caries is the most prevalent of all diseases, although some may hesitate in designating this as a disease; but a tooth is an organ of the body, and a carious tooth is far from a healthy one. Further, I think we are justified in stating that pyorrhea alveolaris might be termed a disease of the investing tissues of the teeth, resulting largely from inflammatory processes of a progressive nature. There is ample evidence that pyorrhea alveolaris is rapidly increasing and, in my opinion, two of the most positive causative factors are the lack of proper use and of proper care of the mouth and teeth. This, like many other points that I have mentioned, could well consume the entire evening's program and then it would be considered only partially.

Enlarged and diseased tonsils could be placed under this head very properly, since they are so closely associated with the oral cavity. They very often afford lodgment for similar organisms and liberate them under like conditions.

Third: The favorable condition for infection through open septic root canals. This is made possible by root canals being filled with septic matter, some of which may be forced through the apical end of the root during the process of mastication. Some such roots may perforate the floor of the antrum and result in antral complications; and there are other opportunities for infection which may prove more or less serious.

Fourth: An area of infection at the apical end of the tooth and "blind abscesses." These usually result from the death of the pulp in a tooth which has never been treated, or from imperfect dental operations, where all the contents of the root canal have not been removed, or where the canals never have been filled, or only partially filled. An area of infection or a "blind abscess" may develop from any of these conditions, with a loss of tissue surrounding the root of the tooth and more or less of a systemic disturbance resulting therefrom. Unfortunately, these infections are slow in being recognized and frequently are overlooked until almost every other suspected cause has been eliminated.

Fifth: Impacted teeth. By "impacted teeth," we refer to those which do not occupy their normal relation and position, and thus are unable to erupt fully, the resultant pressure setting up an excessive inflammation which is responsible for much intense suffering and various forms of nervous disturbances. This occurs most frequently in the case of lower third molars, where there is not sufficient room for them. There is no question that in many instances these aggravated impacted teeth are responsible for various forms of melancholia and even insanity. There are many cases on record in which relief from complicated and serious conditions of this nature have been secured through the removal of the offending tooth or teeth. The X-ray is of distinct value in definitely diagnosing and locating the position of impacted teeth, as well as locating areas of infection and "blind abscesses."

Some of the systemic disturbances, which may have their origin through such pathological oral conditions as I have just enumerated, are as follows: So-called rheumatic, neuraglic, and similar nervous affections; antral, eye, ear, bronchial and heart disturbances; mal-assimilation, mal-nutrition, auto - intoxication; appendicitis, stomach ulcerations and gall - bladder diseases; arthritis and nephritis, as well as many other systemic complications.

Of course, we appreciate that there are many other factors which may be responsible for a very large percentage of the conditions named, but there is no question that the conditions enumerated have more or less of a direct or contributory influence in many of these. Since this is true, and it is all-important to establish definitely an early and correct diagnosis, we call attention to the possibility of infection originating from this source. Also, it would seem in order to suggest that this should be one of the first sources to be eliminated, especially so when it would seem feasible to make a diagnosis by a process of elimination. The reason for saying that this should be one of the first, is the fact that the pathological oral conditions can generally speaking, very readily be eliminated. If this procedure is neglected, it may prove more or less embarrassing at some future time, when it may develop clearly that the origin of the trouble was in some oral infection which never had been suspected, or even inquiry made relative to the condition of the mouth and teeth.

In support of what I have presented to show that there is a dental phase to health conservation, I quote from a few well-known men, whose opinions upon this or any other similar subject merit the most thoughtful attention.

Matthias Nicoll, Jr., M.D., secretary New York State Department of Health, in discussing "Bad Teeth and Bad Health," in the August 23, 1916, number of *The Outlook*, makes the following statements:

"Posterity may be saved from the necessity of falling back on a diet of liquids and tabloid foods if we today recognize the fact that the welfare of the teeth depends largely on the welfare of the body as a whole, and that, conversely, the welfare of the whole body depends largely on the welfare of the teeth.

"Happily, the medical profession has at last come to realize that the field of dentistry is not isolated or independent, but touches at many points the field of general medicine and surgery. It has been found imperative for physicians and surgeons to possess at least a theoretic knowledge of disease-breeding conditions met with in the teeth and jaws, but it is even more important for the dentist to appreciate the close relationship between his profession and that of the physician, surgeon, bacteriologist, chemist and public health official. * * *

"For some time now we have known that civilized man's teeth are deteriorating, despite his efforts to care for these important organs, although primitive man and the lower animals continue to enjoy good teeth without any conscious effort on their part to care for their dental equipment. We also have come to know that many conditions, tendencies and habits of modern life are responsible for this racial degeneration. Among such causes are the artificial feeding of infants; the prevalence of chronic nasal obstruction in the young by adenoids and enlarged tonsils, causing mouth-breathing, which in turn produces constantly dry and therefore unhealthy gums; an improperly-balanced dietary, which contains an undue proportion of soft and partly-digested food, thereby eliminating the healthful necessity for thorough mastication; the bolting of food which should be thoroughly chewed for its complete digestion. * * *

"Only very recently have we begun to appreciate the very serious danger to health, and even to life itself, which lurks in bad teeth. Two diseases of the teeth, in particular, have been engaging the especial attention of bacteriologists, dentists and physicians in the last few years, because they have learned that these two maladies frequently undermine the general health and even endanger the lives of persons afflicted. These are Rigg's disease (pyorrhea alveolaris) and root abscess. * * *

"There is little doubt that a great many morbid physical conditions, whose starting points were until recently obscure, do, in fact, originate in the teeth and surrounding structures. These unhealthy conditions are aggravated and spread by the absorption into the tissues of bacterial products by swallowing or by way of the blood and lymph streams. It cannot too strongly be emphasized that if a tooth cavity cannot be made sterile and filled to the very bottom, no permanent covering of any kind should be placed over it or within it. It is far better to sacrifice a tooth than health and possibly life itself. * * *

"There is just one moment in your life when your mouth is bacteriologically clean. That is the moment of your birth. During all the remaining years your mouth is a veritable botanic garden of bacteria. Most of these bacteria are harmless. Some are harmless in a healthy mouth, but harmful in varying degrees when concentrated in damaged or dead tissues. Some are well-known germs of the communicable diseases, pneumonia, diphtheria, tuberculosis and blood poisoning."

The Research Institute of the National Dental Association, under the direction of Dr. Weston A. Price, has been and is rendering most valuable service in investigating and determining the relation of oral infections to systemic diseases. The dental profession and a few others interested in the work have made this possible through voluntary contributions.

The Journal of the National Dental Association will be published monthly, commencing with the January, 1917, issue, and this will provide the membership with fuller and more prompt reports of findings of the research workers. At the last meeting of the National, an amendment was approved and formally introduced, to be acted upon next year, which will increase the dues one dollar ($1.00) for the support of the Research Institute. This will assure the necessary financial support and equitably distribute the expenses of this important work.

At the formal opening of the home of the Research Institute last February, it was my pleasure to hear Dr. Charles W. Mayo, recently elected president-elect of the American Medical Association. He stated: "In the great changes that are rapidly coming in all lines of thought and endeavor, the medical profession and the dental profession should not be separated. As we see things today, it means that there will be far less surgery and less sickness when the full benefit of the knowledge of modern dentistry and the cause of many diseases become known throughout the world."

Thomas B. Hartzell, D.M.D., M.D., after recently referring to various systemic infections resulting from mouth infections, stated: "In addition to these cases we have on record, the experience gained in the care of six individuals who died as a result of primary mouth infections spreading to other parts of the body, in which cases, autopsy disclosed only the mouth as the primary focus."

In a recent number of *Good Housekeeping*, Dr. Woods Hutchinson, writing under the title, "No Pus Pockets, No Rheumatism," states: "It is not too much to say that proper, intelligent dental care from childhood on will prevent and wipe out at least a third, if not half, of all our rheumatism."

The following is the closing paragraph of an editorial on "Pyorrhea Alveolaris and Vaccines," appearing about three years ago in the *New York Medical Journal:*

"The neglect of this foul and obvious condition has long been a reproach to diagnosticians. Here the dental surgeon's work can take its proper place in relation to the physician's as an inseparable section of general medicine, working toward a result of the highest importance to the health and satisfaction of the victim. The physician will no longer carelessly waive the patient over to the dentist, to the latter's despair, but labor with him to the great comfort of the individual and the protection of the community against one of the most contagious and obstinate of pathological conditions."

Last month I heard Dr. Charles W. McGavran present a record report of conditions found in one hundred cases of arterio-sclerosis. He classified the symptoms on a percentage basis, and it was a surprise to all to note that of the 100 cases, only 35% had what was termed a "good chewing surface." Peculiar enough, 10 of the 35 had artificial teeth, and there is a possibility that some of these might be over-rated. Sixty per cent. had "bad chewing surfaces," and five per cent. had none. Some of the discussers questioned the dental conditions as indicating any positive relation to the disease and there may be good and sufficient reasons in support of their contentions. However, we must not lose sight of the fact that in all probability a large percentage of those with poor chewing surfaces were of long standing, and in that way the individual resistance had been gradually lowered. Thus the faulty mouth conditions were at least a positive contributory factor.

In addition to the men quoted, I only need to refer to the very thorough and convincing work of Rosenow and Billings in furnishing scientific data definitely establishing the direct relation of pathological oral conditions to systemic infections. The exhaustive researches and reported results of such well-known men should go far in convincing all that there is a dental phase to health conservation.

There is a general tendency in every community to endeavor to establish and maintain a low tax rate. This is worthy of the highest commendation, but it can be considered only the part of shortsightedness to overlook the fact that a low death-rate is an important factor in accomplishing this. A low tax at the expense of a high percentage of deaths is not only false economy but is nothing short of criminal neglect.

It is at least false economy for a Board of Education or a Health Board, or the two combined, to fail to establish a dental clinic for those children whose parents cannot provide the necessary dental treatment in order that they can complete the required school course in the specified time. This is better in every way than to permit the child to suffer and drop behind in his studies, thus remaining an additional year or more in school.

There never was a time in our history when the pulse of American citizens, especially those with their full quota of red blood corpuscles, beat so strongly and sympathetically in the interests of humanity and a healthy citizenship, and this is in very positive contrast to what has been taking place in other parts of the world for more than two years. Constructive work of any kind insures progress, while the reverse is the ultimate result of destructive processes. The appalling killing and maiming of thousands, yes millions, in the European War, will undoubtedly, when this conflict is ended, further stimulate the recognition of the brotherhood of man and an increased interest in the conservation of a healthy citizenship.

PYORRHEA*

BY FRANKLIN B. ROBERTS, D.D.S., PITTSBURGH, PA.

HAVING TRIED almost every treatment to give relief and to effect a cure of this most distressing disease, I find nothing so effective as the Ethyl Borate Gas Treatment.

It is a matter of serious doubt that pyorrhea is a systemic disease, but no doubt the disordered condition of the system is a great hindrance in effecting a cure. It is always advisable when undertaking a case to advise your patient to be careful as to his general health; for example, waste products must be eliminated, breathe good fresh air, be exposed to the sunshine, drink plenty of pure water and take moderate exercise. A physician should almost always work with the dentist in these cases.

Pyorrhea has little regard for age, for it attacks old and young and middle-aged. It attacks the thin and the stout, the nervous and those who apparently do not know what nerves are. It attacks the anemic and the rich-blooded, one of inactive habits and the trained athlete.

1. When a case is undertaken, a careful examination is made. This includes X-ray pictures of the entire mouth, which is of great value in effecting a cure.

2. Teeth, in the judgment of the operator, impossible to save, are removed; crowns, bridges and fillings which act as irritants are removed and malocclusion is corrected.

3. The deposits of tartar are removed, using suitable scalers without causing laceration of the gum tissue. The teeth are polished, using proper rubber cups, kuroris tape and wooden hand-polisher, carmi-cleaner and carmi-lustro.

4. The gums are sprayed by the use of the Dunlop machine, properly charged so that a heavy spray comes from the nozzle without the needle. The spray throws a precipitate which is forced into all the pockets and lodges in the interstices of the tissue around the roots. The pyorrhea pocket-packer is now used, forcing the packer into all deep pockets and around all the teeth.

5. Next remove the pocket-packer, spray the gums with the ethyl borate liquid and by the use of suitable pyorrhea instruments and files, dipped in the pyorrhea paste, all deep deposits are removed. This is made quite easy by using the electric light from the switch-board and treating only a few teeth each visit. The pocket-packer is used after each treatment and in addition to opening a field for operation, it also keeps out any irritating substance, allowing the paste with its highly antiseptic characteristics to do its work.

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*Given as a clinic, Odontological Society of Western Pennsylvania, at Pittsburgh, Oct., 1916.

6. When you are sure that they are thoroughly clean, the machine is charged with plenty of ethyl borate antiseptic and 40 pounds of gas. The small needle is placed on the tube; open the valve and the dry gas will come from the needle. Watch the gums for inflation and also for little stringers, known as ducts, which might take up the gas.

The gas will not penetrate healthy tissue, but will destroy the dead matter by stimulating the circulation. The gas travels through all the pus passages and ramification of the teeth and along the jaw by the natural affinity of the dead tissue for the oxygen. Generally, when inflammation is pronounced, there will be a cyanotic condition of the gums, caused by improper elimination, or a lack of oxygen. This gas being carried into the tissues is robbed of its oxygen, and the solids are precipitated into the tissues, causing an inflammation, which brings blood to the parts the same as any other irritation will cause an influx of blood, but with the difference that in this case the tissues are thoroughly oxygenated and circulation is re-established, the cyanotic condition disappearing.

The treatments are repeated until the case is cured. The patients are to be careful in their oral hygiene and oral prophylaxis treatment following from time to time. The fee for this service must be in accord with the time necessary to give the case careful and thorough attention, and is professional service of the highest standard.

ADAPTING THE GYSI ADAPTABLE ARTICULATOR—SELECTING THE TEETH—INSTRUCTIONS IN STAINING ARTIFICIAL TEETH*

BY W. H. RICHARDS, D.D.S., KNOXVILLE, TENN.

MOUNT THE HORSESHOE PLATE on the lower trial plate, by heating and working the sharp projections into the trial plate. Set in the mouth and take upper trial plate; heat occlusal surface; place in mouth; have patient close in normal relations, and if horseshoe plate makes imprint over entire surface, the pressure is equalized; if not, repeat. Next, mark the location of the condyle head at a point one-half inch in front of the tragus of the ear, on a line to the corner of the eye. With the ground glass and face-bow in place, measure and record the lateral or inward movement with the pencils which are in a vertical position, and the point of the pencil at the mark indicating the condyle head. Have the patient make a lateral movement of the jaws, being sure to indicate the starting point. Place the glass-holder on level surface, and with a rule draw a straight line cross-wise at the starting point, then draw a straight line through the inward movement recorded on the glass. Next, draw a line longitudinally on the glass, making the line at the starting point.

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*Read before the Tennessee State Dental Society, 1916.

Determine the degree of angle by laying the degree-meter on the glass with the point directly in the point made by the lines drawn on the ground glass—the extreme point being the starting point. Place the 0 end of the degree-meter on a line with the line drawn in a longitudinal direction through the ground glass, and the line drawn through inward movement recorded on the glass will extend at point on the degree-meter, indicating the degree of inward movement (in this case 24 degrees on right and 26 degrees on left). The ground-glass frame should not be changed until all the measurements are taken from it.

To record the downward or forward movement, first turn the horizontal pencils so that the points are at the condyle heads. Move the pencils out from the skin about the thickness of your finger on one side, to keep the pencil from jabbing the face while you get marking on the other side. Take card, hold on face with edge of card on a line parallel with the occlusal plane of the trial plate, which will be on a line with the face-bow; turn thumb screw on face-bow, so pencil will press against card, compressing the spring about one-fourth of way in; have patient make lateral movement. Repeat same operations on the opposite side, then place the pencil-points against the skin at head of condyle marked before, to guide the models in placing on the articulator, and remove face-bow, seeing that the screw holding pencils in position is tight. Take the card and, with a rule, draw a line straight through the recorded mark made by the patient, lay degree-meter on card with 0 at occlused edge of card, and the point of degree-meter at the angle formed by the occlused edge of card; and line drawn through the recorded mark on card will point to the degree on the degree-meter.

To record the incisor pattern, blacken the anterior portion of horseshoe plate with wax and lamp black, and place incisor path-register on the upper trial plate in such a position that point of pin will rest on horseshoe plate and compress spring about one-half way in tube; and in order to see the pin work over the horseshoe plate, place both trial plates in mouth, after putting a little gum tragacanth on them, let the pin down on horseshoe plate, have patient make a lateral movement until a point is formed on horseshoe plate, at this mark.

Mark the trial plates that they may be placed in proper relation when taken out of the mouth. To mount on articulator, move rotation pins to farthest point out, set the lateral or inward movement, recorded on glass, by loosening thumb screw on top of condyle path, and move condyle path as degree recorded. To set downward or forward movement, loosen screw with hole through head, set the spear-shaped point at degree desired, and tighten the screw; wax models together; place horseshoe plate in face-bow, and face-bow on goose-neck tripod; regulate the pencil points with condyle pin points by placing articulator equal distance between the two condyle pins, and move face-bow up or down by setting goose-neck on tripod and balancing face-bow on goose-neck with small front set screw. Apply plaster and let set; remove face-bow, separate the trial plates and set rotation pins to the position where the guide pin follows outline of pattern on horseshoe plate.

TO SET UP THE TEETH

Grind edge of centrals on an angle to center of palate. Grind the lateral on an angle to the posterior portion of hard palate and the cuspid on an angle with a line drawn to the linguo-gingival border of first upper molar; and the lower cuspid to the same angle. Set up anterior ten teeth so that the incisors, cuspids and bicuspids rest on a level plane, the laterals a little short of this plane, the mesio-buccal cusp of first molar rests on same plane with the disto-buccal cusp, fall short a little, forming a curve, the second molar inclined the same way, except a little shorter.

The first bicuspid should have lingual cusp little shorter than the buccal, set on an angle to produce the effect. The second bicuspid cusps should be same height and the lingual cusps of the upper molars should extend higher than the buccal cusps.

The cuspid and molar should be on a line with the bicuspids, falling back to the lingual, where a straightedge is held on buccal surface of the teeth. The lower should be set up to occlude with the uppers. The bite should be opened about one mm., and the upper posteriors lowered to articulate with the lowers; the bite opened another mm.. and lower posterior raised to occlude with uppers. Raise the incisal guide pin one-half mm.; heat the upper posterior and press the uppers to articulate in lateral and occlusal positions; repeat this on the lower, and lowers again, and the teeth are ready for automatic grinding with the carborundum powder. Where grinding of teeth is necessary, it should be done on a surface where it will not mar the occlusion when jaws are at rest. The upper bicuspids should occlude with the lowers in such a manner that the point of the cusps of the upper bicuspids should occlude slightly, distally to the point between the lower bicuspids.

The occlusal groove of a tooth should not be a straight line, but should be a zigzag groove.

The greater the inward movement, the farther the over-bite can extend, as the movement will be more lateral than it will be forward. The teeth in chewing have three movements. To crush the food, the teeth move laterally over each other, and the mandible has a forward movement, caused by the action of the pterygoid muscle. It is this muscle that controls the position of the rotation point.

The six anterior teeth are selected first, the length to high lip-line, then the width of the six upper anteriors. They are selected in group, for the following reason: When you meet a person on the street, you first see a line of teeth, not showing any shape, then you see the shadows show up, then the outline of the teeth individually. Therefore, first select for the length, then width of six anteriors, then outline of the anteriors, then width of fourteen uppers. The bicuspids and molars are selected in accordance with the space left between the cuspid and tuberosity of the maxilla. The bite-and-shut is governed by the distance between the top of the ridge and the incisal edge of the bite-plate, dividing equally between both. Select lowers likewise.

STAINS

The mineral stains for staining artificial teeth are the Lacroix stains, such as used by china painters. The colors mostly used are yellow, brown, rose pompadour for pink, ivory, black ivory yellow, celestial blue, sepia to darken yellow, brown, relief white. Never mix colors, but when two colors are needed, make two bakes.

Thin your color stains with oil of lavendar flowers. Be careful with blue, black or white. Remove glaze from tooth before staining. Porcelain can be baked over blue, but not over all colors.

To make the white spots often seen on teeth, grind out a little saucer-shaped depression, the size you wish white spot, and fill with white porcelain; bake and trim level with a disk. Use a medium grit disk on tooth after baking. Bake on all stain until glaze is about a cherry red. When the color stain is not satisfactory, it can be removed by an application of hydrofluoric acid. Care must be taken not to get the acid on the finger nails.

Some very artistic effects can be had by selecting a tooth larger than desired for the case and grind it to a more natural shape, removing the glaze smooth with medium coarse and thin cuttle-fish disks, polish with oxid of tin. In grinding the teeth, the wheel of the lathe can be kept moist by having a piece of absorbent cotton dipped in water and fastened to the finger with a rubber band, and allowing it to rest against the wheel.

Michigan State Dental Society

Detroit, the wonder city of the middle west, will be the meeting place for the sixty-first annual meeting of the Michigan State Dental Society, April 12, 13 and 14, 1917.

The growing necessity for individual efficiency in dental operations, should find seven hundred of the eight hundred members of the society present. "It is for better dentistry."

All ethical dentists are invited to attend and become members, and members of other associations are cordially invited.

C. G. Bates, *Secretary,*
Durand, Michigan.

Tennessee State—Golden Jubilee Session

The Golden Jubilee of the Tennessee Dental Society will be held in Memphis, June 19, 20, 21, 22. The officers promise the most attractive programme ever presented in the South. Social features will be prominent. All ethical dentists invited—come and bring your wives.

D. M. Cattell, *President.*
C. E. Hines, *Secretary.*

CORRESPONDENCE

THE NURSE ANESTHETIST

During the executive session of the Interstate Association of Anesthetists, held in conjunction with the National Dental Association, in Louisville, Ky., July 27, 1916, the following resolution was unanimously adopted:

> *Resolved,* That this Association through its officers, its official journal, the medical and dental press, and its individual members, bring to a definite end the administration of anesthesia by unlicensed persons."

Action against unlicensed anesthetists was necessitated because the abuse is becoming more and more prevalent and certain influences within the allied professions are being used to aid and abet the introduction of nurse-anesthetists into the interstate practice of medicine, in violation of ethics and law.

At its meeting of April 4, 1911, the Ohio State Medical Board declared the administration of anesthesia the practice of medicine, and ruled that only licensed physicians were qualified anesthetists. The board's action received the endorsement of an opinion from the then attorney general, Hon. Mr. Timothy Hogan. In 1912, pursuant to a further opinion of the attorney general, the statutes governing the practice of medicine and dentistry were so amended as to legalize the administration of anesthesia by licensed and registered dentists.

In August, 1916, the Ohio State Medical Board, on petition from anesthetists and surgeons throughout the state, withdrew recognition of Lakeside Hospital as an acceptable training school for registered nurses until it discontinued courses in anesthesia to nurses and the use of nurses as anesthetists.

Those affected by this decision demanded a hearing, and this was accorded them by the board, and was held in the senate chamber of the state house, Columbus, on the afternoon of October 2, 1916. After a thorough presentation of both sides of the controversy, the Ohio State Medical Board sustained its original decision.

Lakeside Hospital was specifically moved against because, not satisfied with using nurses in the routine administration of anesthesia, this hospital was training nurses and office assistants with the purpose and intent of sending them out into the interstate practice of this specialty.

On presentation of a signed statement from those in authority at Lakeside that only licensed physicians would be instructed in anesthesia, and only licensed and qualified anesthetists would be used in its surgical clinics, the

Ohio State Medical Board reinstated Lakeside Hospital as an acceptable training school for registered nurses.

Then it developed that the Cleveland contingent would not abide by the decision of the Ohio State Medical Board.

In November, 1916, Mr. Howell Wright, newly elected state senator from the Cleveland district, and also executive secretary of the Cleveland Hospital Council and the so-called Ohio Hospital Association, circularized the constituent hospitals of the council and association with a view of securing sufficient support to warrant the introduction of an amendment to the statutes governing the practice of medicine and dentistry, that would legalize the nurse-anesthetist.

The circular letter and questionaire issued by Mr. Wright is misleading in that it projects the issue of the medical and dental interne into the controversy. A similar effort was made by the Cleveland contingent at the Columbus hearing, and President Siemon, of the Ohio State Medical Association, interrupted the proceedings to state in an emphatic manner that the board and the organized anesthetists were a unit in protecting the rights and privileges of the medical and dental interne in his education and training, in any and every phase of the practice of medicine and dentistry under proper supervision.

Thus the only issue in the controversy and in the prospective amendment is the legalizing of the nurse-anesthetist.

Upon recepit of information regarding the activity of Mr. Wright and his organizations, the Interstate Association of Anesthetists presented the matter to the officers of the Ohio State Medical Association and a set of resolutions, discountenancing any amendment to the existing law, was drawn up and are now being passed by all the larger county societies.

Similar sets of resolutions have been issued to dental societies throughout the state for adoption.

It is to be hoped that the medical and dental professions will be a unit in opposing this reprehensible effort to tamper with the existing statutes governing the practice of medicine and dentistry.

Thousands of physicians and dentists have complied with every requirement of the license and registration law, and this effort to amend it in behalf of nurses is a treacherous attack from within the profession, and if passed, would infringe on the rights and privileges already accorded under the law. Moreover, it would put medical and dental specialists in anesthesia in competition with cheap labor.

The nurse does not conform to any of the standards of preliminary education, training or license to which medical and dental anesthetists submit. She is maintained and subsidized by the institutions employing her, while the physician and dentist must succeed on a professional fee basis. To force physicians and dentists into competition with salaried nurses is a rank discrimination.

If certain nurses have the making of anesthetists in themselves, let them conform to the legal requirements for the practice of medicine or dentistry. If they have not the preliminary education or talent for this, they lack the essentials for becoming anesthetists.

The legal control of medicine, to the requirements of which so many thousands of physicians and dentists have already conformed, is being attacked by every conceivable ism and fad. If the integrity of these statutes now governing the practice of medicine and dentistry are not conserved, the whole legal control of medicine and dentistry, for the protection and benefit of the people of Ohio, will go into the discard.

The contemplated amendment, legalizing the nurse-anesthetist, is against the ethical and legislative policies of all foreign medical and dental associations and the governments of all civilized countries.

The practice of allowing nurses to administer anesthetics in surgical or dental operations is non-existent in England, the United Kingdom and its overseas possessions. The General Medical Council, the British Medical Association, the Royal College of Surgeons, the British Dental Association, the British Association for the Advancement of Science, and the Medico-Legal Society have, one and all, endorsed legislation placing the administration of anesthesia in the hands of qualified medical and dental practitioners.

Germany and Austria have gone further and have empowered their local Boards of Health to pass stringent regulations governing the use of anesthesia and analgesia by qualified physicians and dentists.

At the present moment a special committee of the French government is attempting a solution of the medico-legal problems involved in enforced submission to operations under anesthesia for lessening the disability consequent to war wounds in pensioners. All foreign and American courts of last resort hold that under pension and workmen's compensation laws that pensioners or employes must submit to any reasonable operative procedure that will decrease their disability, under penalty of having their pension or compensation reduced to a minimum. The only legal exemption being the decision of the medical referees, that the patient's condition makes the administration of an anesthetic an extra hazard to life.

The following decision is quoted to show the attitute toward the unlicensed anesthetist which gives promise of establishing a permanent precedent in American courts:

NATIONS VS. LUDINGTON, WELLS & VAN SHAICK LUMBER COMPANY

> In this case the patient, a laborer, died from the effects of the anesthetic before the operation was begun. The Supreme (Appellate) Court of Louisiana held that the employment of a *non-medical anesthetist*, with no emergency existing, *constituted negligence*, and increased the damages awarded the plaintiff by the trial court to

$10,000. The Supreme Court was emphatic in its declaration that in the case adjudicated, one contemplating minor surgery only, *a physician should have been employed to administer the anesthetic, although the officiating anesthetist was experienced in this line of work and administered the anesthetic in the presence and under the direction of the surgeon.*

In view of this decision and the punitive damages assessed it is not likely that surgeons will long maintain their contention that they are privileged to select their own (unlicensed) assistants, and that they are willing to be responsible for anesthetic fatalities when the anesthetic has been administered by an unlicensed person. Nor are the employers under the compensation law apt to take kindly to punitive damages to the extent of $10,000.

In view of the fact that the Ohio Industrial Commission has already paid a number of full indemnities for deaths under anesthesia during operations under the compensation law, the decision in Nations vs. Ludington amply supports the Commission in its efforts to absolutely restrict the administration of anesthesia to licensed physicians and dentists in all workmen's compensation cases.

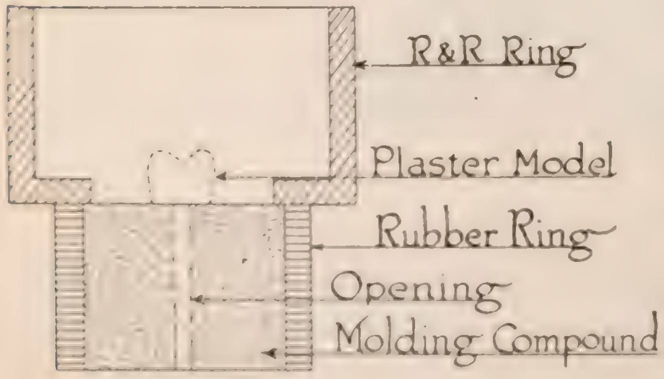
It is to be hoped that in view of the foregoing considerations that the dental profession of Ohio will join with the medical profession in urging the legislature of Ohio to defeat any amendment to the law legalizing nurse-anesthetists, if introduced, and will further call upon the governor to veto such an amendment, should it pass.

F. H. McMechan, M.D.
Secretary Interstate Association of Anesthetists.

TO ELIMINATE AIR BUBBLES IN THE POURING OF MELLOTS OR OTHER METALS OVER DRY PLASTER MODELS

METHOD FOR SEAMLESS CROWNS

Take ordinary rubber ring, fill full of molding compound. Through center of mold composition bore a hole the thickness of a match. Over one end of the opening set your plaster model. Take molding ring to the R. & R. Practical Crown Outfit, which is equipped to make a split counter die, and place same on rubber ring.



Place on Elgin Casting Machine. Pump same to about 6 vacuum; heat metal and pour while hot, and at same time release vacuum.

The above method, with slight variations, can be used for all cases where metal is poured over plaster models.

EDITORIAL

ANENT ARMY AND NAVY DENTAL SURGEONS

When we consider what army dental surgeons are doing for the soldiers in European countries now at war, when we consider what dentistry means to the efficiency of men in the army, when we consider what baneful systemic conditions result from diseased teeth and other pathological oral tissues, and the important service that dentists are rendering to humanity in curing and preventing these diseased conditions by efficient dentistry, we are led to wonder why army and navy dentists should not receive the same recognition as to rank, pay and allowances as members of the medical corps.

In a communication published about a year ago, Surgeon A. M. Fauntelroy, U.S.N., Washington, D.C., paid a glowing tribute to dentists for the work they are doing in the European war. Concluding, he said: "There can be no question of the value of placing the teeth in order, as shown by the improved digestion and general good health following this work. In many instances the complications following operations are directly traceable to an unhealthy condition of the mouth. So true is this that the careful surgeon is beginning to insist upon a thorough inspection and treatment of the teeth, whenever it is practicable, before undertaking any major operative procedure."

Today the dentist works hand in hand with the great surgeons of the world. Today dentistry overlaps medicine and the physician counsels and co-operates with the dentist in his endeavors to conserve the health of the people.

Look what France has done—increased her dental corps by one thousand dentists to keep the large and growing number of soldiers suffering from oral diseases, on the fighting line. German efficiency and foresight established a compulsory system of dental treatment among the school children some years ago so that her future soldiers would be dentally prepared. The result is that she does not have to have a vast number of dental surgeons now to treat pathological conditions, for many were eliminated before the men were called into the army. Yet we Americans boast that we were the fathers of dentistry!

The Canadian Army Dental Corps, through the Canadian Dental Societies, has been organized on an efficient basis and has demonstrated its usefulness and ability against greater odds than the American Dental Societies ever have had to contend with.

In the Canadian Dental Corps, rank as high as Colonel is given. We understand that the French and German Dental Corps give the same rank.

Until last spring the United States Army Dental Corps had only the rank of lieutenant. Congress has now given the Dental Corps rank as high as Major, but with restrictions as regards advancement. For instance, if one belongs to the National Guard in the capacity of a dental surgeon, he has the rank of a first lieutenant. If he joins the dental section of the officers' Reserve Corps, he still has that rank.

Army and navy dental surgeons cannot be appointed captains or majors in the Reserve Corps as are men of other professions, viz.: physicians, lawyers, clergymen, business men in the Supply Department (Quartermaster Corps). Why? Because Congress has fixed a term of years that the dental surgeon in the army and navy will have to serve before he can secure higher rank. Under the present law, one has to serve eight years before he can become captain, and twenty-four years before he can become a major, the present highest rank allowed, and the number in that grade are limited in both army and navy corps. The law that created these corps is applicable to the militia dental surgeons and dentists in the officers' Reserve Corps.

See the inconsistency of this: Your friend who is a lawyer can be appointed a captain or major; your friend, the politician, without technical education, can be appointed a quartermaster; your medical friend can be appointed either a lieutenant or a major. But the dental surgeon must remain a *First Lieutenant for eight years.*

So long as a dental corps exists either in the army or navy according to a standard set by Congress, *that government standard will be the standard that the mass of people throughout the United States will accept and recognize.*

In his own city or town a dentist may be recognized as a man of importance on account of the services he renders his town people, but outside that sphere he is judged by the standard set for his profession at large.

This standard, in comparison with that of allied professions, is to a great extent that set by Congress, and this at the present time is below what it should be, compared with the service rendered.

In all legislative matters dentists in general take too little interest. It too often resolves itself into a matter of "letting George do it," and George, single-handed and alone, fails to obtain the legislation desired.

Let every dentist feel a responsibility resting upon him for his own sake and that of others, and make every effort possible to secure just legislation and recognition.

The united efforts of fifty thousand dentists would obtain any state or national legislation within reason. It is your duty to act; will you, or you, or you shirk that duty?

Now, listen! You have been informed in this editorial why the present army and navy dental legislation is not all that it should be, and I want to call your attention to a suggested measure that will better the conditions for our dental corps, and the dental profession as a whole. The following has been indorsed by the National Dental Association (at Louisville meeting in July), California State Dental Society, Kentucky State Dental Society, Washington State Dental Society, Association of Military Dental Surgeons of the United States, Washington State Society, Oregon State Society:

> "Hereafter the Dental Corps of the army shall consist of commissioned officers in the several grades as authorized for the Medical Corps, who shall have the same rank, pay and allowances as officers of corresponding grades of the Medical Corps, including the right to retirement as in the case of other officers, and there shall be for every seven officers of the Medical Corps authorized by law one officer of the Dental Corps. Dental officers shall be proportionally distributed among the several grades as in the Medical Corps, and their promotion shall be governed by the laws governing promotion in the Medical Corps:
>
> "*Provided*, That examining and review boards shall consist of one medical and two dental officers. Immediately following the approval of this Act all dental surgeons then in active service shall be re-commissioned in the Dental Corps, in the grades herein authorized, in the order of their seniority, and without loss of relative rank in the army."

We urge all state dental societies, whether components of the National or not, and all other dental societies to indorse this form so that when the National Dental Association, through its Legislative Committee, goes before Congress again we will have a united front, and an influence back of our demands that cannot be ignored.

Officers of societies, will you do it?

The Forsyth Banquet

On Saturday evening, January 20, 1917, there occurred one of the most memorable meetings in dental annals, when a loving cup was presented to Mr. Thomas Alexander Forsyth, a Boston capitalist and philanthropist, by his admirers and grateful friends in the dental profession of the United States.

Nearly five hundred people participated in the happy event, and the utmost good-fellowship prevailed.

Dr. Lafayette L. Barber, of Toledo, president of the National Dental Association, presided, and Dr. W. H. G. Logan, of Chicago, president-elect, was toastmaster, and discharged his duties admirably. His Excellency Samuel W. McCall, governor of Massachusetts, and Hon. James M. Curley, mayor of Boston, made brief addresses, and were followed by Dr. A. L. Lowell, president of Harvard University, Dr. H. C. Bumpus, president of Tufts college, Dr. E. H. Smith, Dean of Harvard Dental School, and Dr. H. S. Cleaveland, president of the Massachusetts Dental Society.

Dr. H. E. Friesell, Dean of the Pittsburgh Dental college, made the presentation address, and in so doing expressed in a beautiful testimonial the grateful feelings of the dental profession, and a prophecy as to the bearing of the action of Mr. Forsyth on the future of dental philanthropy, as well as its influence upon future generations.

Dentists were present not only from New England, but as well from Chicago, Kansas City, Baltimore, New York, Rochester, and many other points, including many of the most prominent in the profession.

More detailed report will follow in our March number.

SUGGESTIONS

Conducted by F. R. Chapman, M.S., D.D.S., Comumbus, Ohio

(To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Bldg., Columbus, Ohio.)

Care of Hands in Laboratory

Before opening vulcanizer, or working in plaster, or with flasks, if you will wash hands in soft water with good soap, and, while still moist, pour on and rub in olive oil, you will find when you are ready to cleanse the hands that the stains have not penetrated the skin.

—*J. M. H., Dental Review.*

Hemorrhage Following Extirpation of Pulp

The removal of a pulp is commonly followed by a copious flow of blood. This should be encouraged, never checked with hemostatics. Either use paper canal points to invite the flow of blood or syringe out with warm sterile water. Allow the bleeding to cease naturally. This depletes the capillaries and renders secondary hemorrhage less likely.

—*R. Ottolengui, Dominion Dental Journal.*

Some Extreme Methods

In some very badly decayed first permanent molars, after only superficially removing the decay, a regulating or any other band may be hastily attached to tooth, and the crown surface liberally filled with a creamy mix of copper cement. The effect will be to reduce the sensitiveness, sterilize the part and tide the tooth over until more thorough work can be accomplished. Decay will not return or advance from the copper cement filling. The band may be removed or not and the tooth dismissed for years. At a later date the gums will have receded, the stump made healthy, the apex become normally constricted and permanent work invited.

—*F. E. Burnett, Dental Review.*

Iodin Contra-Indicated in Pyorrhea

The most sinful practice in employing drugs in this disease is that of using iodin. It is the most common drug used, and the most harmful. It aids the atrophic changes occurring in the alveolar process which constitutes the fundamental cause of the disease. All other factors, such as irritation from careless prosthetic work or from deposits or malocclusion, etc., and the consequent infection, are all secondary. It is therefore highly important that no agent be introduced into those tissues which will aid the retrograde metamorphosis, and this is the most conspicuous physiological action of iodin. It is the agent *par excellence*, which should be selected if we were seeking to defeat the cause we espouse. That iodin is destructive to the tissue cell, and by this method aids absorption of tissue, is so well known to medical men, and is supported by such authoritative research, that it is a source of great surprise that the dental profession has so universally fallen into this error. Remembering that it is our duty to check the absorption of the process, iodin in this practice must be absolutely abandoned.

—*M. H. Cazier, Dental Items of Interest.*

Preparation of Cavities

In opening up cavities on the occlusal surface which do not show any central support, the use of cone-shaped stones is most effective. The walls can be removed gradually without any shock to the underlying dentin or to a partially-exposed pulp.

—Basil Jones, Commonwealth Dental Review.

To Relieve Pain of Hypodermic Needle

Ethyl chlorid, on a pledget of cotton wool applied to the gum (well away from tooth) previous to inserting the needle for injection, will be found to lessen the pain very considerably. I find this method very helpful in dealing with young children.

—W. A. Love, Commonwealth Dental Review.

Arsenic

Arsenic should never be used. I say never because there is practically no condition in which it is excusable. If pressure anesthesia should not prove effectual, we still have conductive anesthesia, as well as intra-osseous anesthesia. In extreme cases we may even use full anesthesia, for which purposes I have used nitrous oxid and oxygen, and even chloroform.

—R. Ottolengui, Dominion Dental Journal.

Fatal Case of Poisoning by B-eucain

The following case is of interest on account of the extreme rarity of a fatal termination to acute eucain poisoning, and also on account of the fact that there was during life nothing to indicate that the patient was likely to suffer any ill consequences. I can find no published record of a fatal case of acute eucain poisoning.

On July 14, 1915, C. L. P., aged 10 years, apparently in the best of health, visited a registered dentist to have a tooth extracted. The dentist injected into the lad's gum about 2 minims of a 2½ per cent. solution of B-eucain lactate, prepared by a qualified chemist about two weeks previously, according to the following formula:

B-eucain lacate, ʒ i.
Adrenalin hydrochlorid solution (1 in 1,000), ʒ i.
Ol. menth. pip.
Chloroform, aa, min. iii.
Normal horse serum, ʒ iii.
Water (filtered and sterilized), ad. v.
M. Ft. inject.

He had used this same solution many times previously on other patients, without any untoward results. Almost immediately after the injection the patient collapsed.

I was at once sent for, and arrived immediately afterwards. In the meantime, amyl nitrite was given to the patient and artificial respiration performed. On arrival, patient was comatose, cyanosed and breathing very feebly, and was pulseless.

I injected 0.1 gm. (1.5 gr.) of camphor (vaporole) hypodermically, and gave oxygen; and also applied a foradic current to the back of the neck. The corneal reflex was absent, the pupils were fixed and half-dilated.

The patient recovered somewhat. The corneal reflex returned and the pupils reacted sluggishly to light. The color improved, but he never regained consciousness.

A good deal of mucus was heard rattling up and down the trachea, and occasionally came up into the mouth but every attempt to wipe the mouth out stopped the breathing.

About 15 or 20 minutes after my arrival, as the patient seemed to be going off again and the heart sounds were very feeble, another injection of camphor was given, with 1 c.cm. of pituitary extract, and 15 minims of ether were injected into the heart. The breathing now was of Cheyne-Stokes character. The corneal reflexes were absent at this time, and the pupils became fixed and dilated. The patient was choked up with mucus and frothing at the mouth.

Breathing stopped completely half an hour after my arrival, but as auscultation indicated that the heart was still beating feebly, artificial respiration and the administration of oxygen were continued for about half an hour, the foradic current being applied at intervals to the neck. At the end of this time no heart sound could be heard, and the patient was quite dead.

The mode of death was in some ways very sugegstive of anaphylaxis.

The medical history of the boy does not contain anything to indicate the possibility of the catastrophe that occurred.

REPORT OF POST MORTEM.

The body was that of a boy, about 10 years of age; it was only moderately well nourished. Rigor mortis and post mortem staining were present; there were several marks of puncture in the cardiac region.

On opening the body an oder of ether and of camphor was observed.

The large veins of the neck and chest were distended with dark, fluid blood; the right side of the heart was also distended with similar blood. The cardiac wall was thin and flabby, both ventricles were dilated; the tricuspid orifice admitting four fingers, the mitral three with difficulty; there were streaks of atheroma about the base of the aorta.

There was slight œdema of the folds about the glottis; the windpipe was congested; the bronchial tubes contained a little fluid; the lungs were congested.

The lymphoid structures of the body internally were hypertrophied, especially the tonsils, the follicles at the root of the tongue, the thymus gland, the mesenteric glands and the Peyer's patches and solitary glands of the intestine.

The liver and spleen were tough. Microscopic sections of the liver showed thickening of the capsule and stroma in the substance; the small arteries were thickened, and their endothelial lining showed proliferation.

The kidneys were firm; the cortical substance was swollen-looking; the stomach contained a little thick fluid and food; the brain was congested.

—*Judah Leon Jona, D.Sc., M.D., B.S., Malvern, Victiora, in Medical Journal of Australia.*

Aseptic Treatment of Canals

Formerly he (the writer) used rubber gloves. Later he tried covering the thumb and middle finger with rubber cots. Now he prefers to wrap the broach with the bare finger, because it can be better done, using only the minutest shreds of cotton, thus rendering it possible to enter very fine canals.

After wrapping the broach with cotton it is dipped in peroxide of hydrogen, in which is incorporated bichlorid of mercury in the proportion of one to five hundred. With this the canal is washed out. The cotton is then removed from the broach with a sterile napkin. This procedure is continued until these wipings show no discolorations.

—*Editorial, Dental Items of Interest.*

An examination of the histories of 498 cases of chronic arthritis in the service of Dr. Frank Billings, at the Presbyterian Hospital. Chicago, furnishes valuable information on the incidence of chronic mouth infections. Of this number 332 had careful Roentgen-ray mouth examinations: 1,132 periapical infections ranging from small areas of rarefaction to gross bone lesions were recorded; 994 of the teeth involved had been treated, with varying degrees of root-canal fillings, and 138 teeth showed no evidence of root-canal treatment. The percentage of patients in this group showing definite Roentgen-ray evidence of chronic alveolar abscess was 89; 1,342 teeth were involved in varying degrees of pyorrhea, the diagnosis being based largely on the Roentgen-ray evidence of peridental membrane destruction. Seventy-six per cent. of the patients showed well-defined pyorrhea, many of them well advanced with marked suppuration.—*Journal A. M. A., Dental Register.*

OBITUARY

Dr. H. W. Harvey

AS briefly mentioned in another department last month, the death of Dr. H. W. Harvey, of Battle Creek, Mich., occurred at a sanitarium at Waukesha, Wis., on Friday morning, December 22d, 1916.

Dr. Harvey was one of the best known and most public spirited citizens of Battle Creek, and his death is lamented by every citizen. Dr. Harvey was president of the Community Club, and took an active part in all of the work of that organization. He also was a member of the Board of Education, was interested in open-air schools, vocational training, and all other school improvements.

Dr. H. W. Harvey was born in Kent county, Ontario, 45 years ago, and spent the first twenty years of his life in Canada. For some time he was a teacher, and then he entered the dental department of the University of Michigan, graduating with the class of 1899.

He remained with the university as demonstrator for a year, and then came to Battle Creek.

Dr. Harvey had been ill for some time, but only his immediate friends knew of his illness, as he made a remarkably brave effort to regain his health.

Besides his wife, who was with him in Wisconsin, he is survived by two daughters, Frances and Helen, and a son, Harry. A nephew, Earl Harvey, of Lansing, is well known in Battle Creek.

He had personally organized and directed, during the past two years, the prize contests for beautiful homes and lawns, and this was but an expression of his constant thought for the town. His protest was not that service for the community burdened him, but that he lacked the strength to serve the community as he desired.

Frail and worn, but an optimist, and a friend of folks to the last, he put in modern form that ancient formula of heroism: "For how can men die better than in facing fearful odds, for the ashes of his fathers, and the altars of his gods?"

The work which Dr. Harvey has done for his city will abide long with Battle Creek.

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

LACONIGRAMS

Just as we are about ready to print the February number, the *Michigan Dental Journal* for December comes along, bearing the announcement that, with that issue, it ceases to represent the state society in the capacity of official magazine. I wish that the editor of every dental journal in the world might see the brilliant cartoon with which the issue of the magazine mentioned is illustrated and illuminated! It certainly is instructive to see just how editors are making money for their owners! Honestly, fellows, if there is a dental magazine anywhere that is making any money, that is earning even enough to meet its fixed charges, I would like to have a copy to frame; and, if there is a "commercial" dental magazine that in any manner or degree attempts to control the expression of its editors and correspondents, I should very much like to add a copy of that one to my collection of curios. Of course, I am referring to those publications that charge a nominal subscription, and give the value of a year's subscription in every number.

The Ransom & Randolph Co. announces the opening of its fourth branch, the last one being located at Flint, Mich., with Mr. James F. Bayman in charge.

Dr. Otto U. King, National secretary, announces his retirement from general practice. This action has been made necessary by the heavy increase in the work of his office occasioned by the change in National Journal from quarterly to monthly, and other important duties. Shows that even a good man cannot spread himself out too thin without something suffering.

Lavoris is a mighty good thing to have about the house these grippy days. Use as a daily mouthwash and as a nasal douche, it will induce a healthful condition of the tissues and often abort serious consequences of infection.

The Supreme court of the state of Illinois has reversed the decision of the lower courts in the case of Drs. C. M. Carr and J. J. Kitteringham, who were convicted of practicing dentistry without license. This decision removes the dissability from these gentlemen, and restores them to the privileges enjoyed prior to the prosecution.

If you have not renewed your subscription to the SUMMARY, and intend doing so, kindly take action at once, so that our lists may be kept in correct condition during the year. Bills will be sent to all old subscribers who have not renewed, which I hope they will regard as notice of expiration and act accordingly. I have known of some who gave every sign of being extremely peeved by the receipt of such notice, a condition of mind certainly not warranted by the circumstance.

After this issue of The Dental Summary had been sent to press, news reached us of the death, on January 9th, of Mrs. Mary C. Martin, wife of our good friend Dr. G. B. Martin, of Frankfort, Ind., after a long illness. Dr. Martin has the sympathy of his many friends, among whom we are glad to be numbered.

Dr. A. H. Breitenwischer announces the removal of his office to 1545-7 the Nicholas, Toledo.

If I were a practicing dentist and had cases of pyorrhea to look after, I would get into communication with Dr. G. B. Martin, Frankfort, Ind., and learn all he has to tell about his method of treatment. After thirty years' test, with almost unanimous success, Dr. Martin is now for the first time, offering his remedy to the profession.

One result of Dental Week in Chicago was the discovery that 300,000 children have defective teeth and diseases of mouth and gums. If half of these children are so seriously handicapped as to miss one grade, the cost to the city would be $6,000,000 more than the education of those children should cost. "Small leaks sink great ships," and here is one way in which the money of municipalities is wasted. How about your own town?

Children of one Brooklyn school peddled out one ton of peanuts, and turned over the proceeds for the purpose of fitting up a dental clinic in their building. With this clinic the Board of Education has nothing whatever to do. It is owned by the children, the dentists who operate in it are paid by the children, who raise the money in some such manner as that described. In the peanut deal, every child who sold ten bags was given a button. One boy sold 150 bags. Every penny raised is turned into a common fund, and every child in the school is entitled to dental service free of cost.

Dr. Alfred R. Starr, dean of the New York College of Dentistry, has announced the opening of a free clinic for children between seven and fourteen, Saturdays, 1:00 to 4:00. Ninety chairs have been provided. This is the first free college clinic in New York.

Teach your patients how to behave in the chair. Some of them raise a yelp if you merely look at them. Tell such patients the old story of the boy and the wolf, and let them distinctly understand that groans and moans and crys when there is no pain are certain to interfere with good work, as well as to bring about conditions in which more pain must be inflicted than is at all necessary.

Friends of Dr. Earl Brooks, Noblesville, Ind., will be glad to know that his paper, "Decay of the Teeth," read at Indianapolis last May, has been reproduced from THE SUMMARY in Scientific American Supplement for January 6th.

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXVII MARCH, 1917 No. 3

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The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
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REGULAR CONTRIBUTIONS

PARTIAL DENTURES*

BY W. E. CUMMER, D.D.S., L.D.S., TORONTO, CAN.

PROFESSOR PROSTHETIC DENTISTRY AND APPLIED DENTAL PHYSICS,
ROYAL COLLEGE OF DENTAL SURGEONS.

UNQUESTIONABLY the big problems in dentistry arise from clinical and X-ray proof of frequently grave and occasionally fatal systemic disorders produced by centers of infection. These often are found at the ends of imperfectly filled root canals, unsuspected dead pulps and similar, and the conditions are aggravated by poisons arising out of improper digestion due to imperfect mastication, the admixture with saliva of bacteria and bacterial poisons resulting from sore, loose or discharging teeth, irritating and unsanitary crowns or bridges, improperly made and gum margin destroying clasps, impinging rubber saddles, and other all-too-frequent offenses against good dentistry. Next in importance to the need of a rational root-canal and peridental treatment within the reach and means of the public through the average and near-average dentists, is the need of a simple, sanitary, non-irritating and mechanically efficient system of restoring lost teeth; also well within the reach and means of the public through the average and near-average dentist and his efficient and faithful ally, the laboratory man. With the indications pointing strongly at the present time towards extraction of all roots or teeth shown by clinical signs and X-ray to be not amenable in a reasonably short time to known methods of treatment and apex surgery, as well as a strong disinclination on the part of the thinking

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*Read before the Ohio State Dental Society, December, 1916.

*We desire to give credit to *Oral Health* for the use of cuts illustrating this article.—Editor.

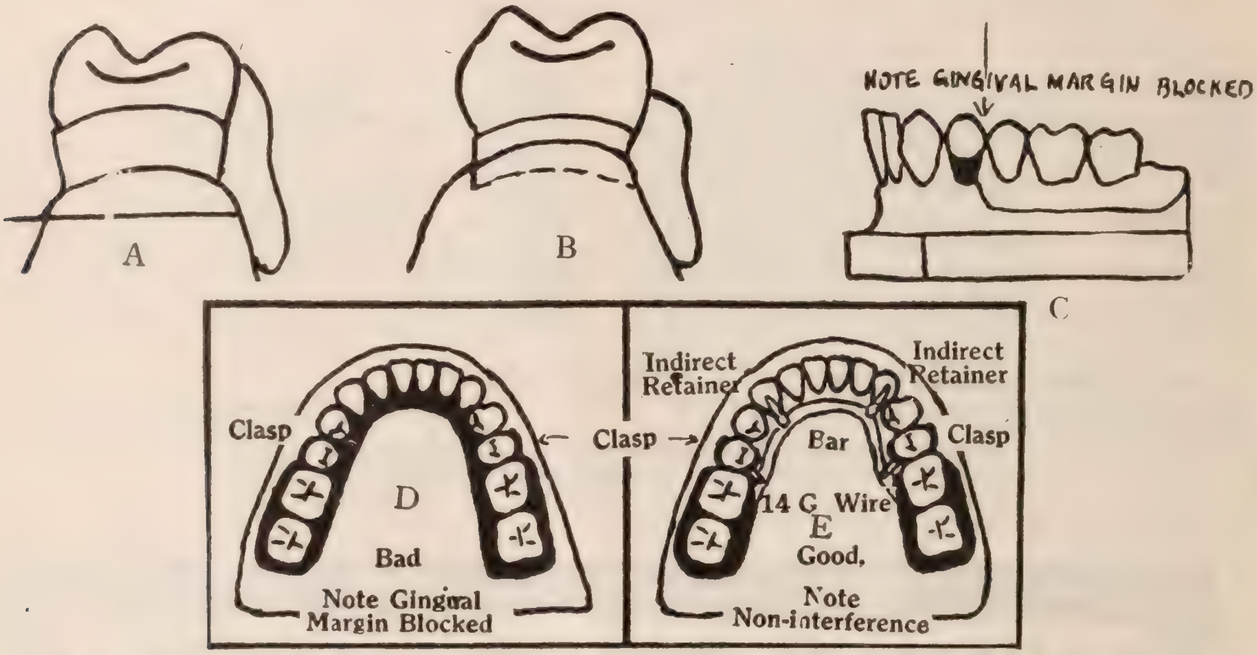


Fig. 1A—A common example of destructive dentistry, clasp fitted to the gum (with high lingual base). (A) Before "settling" invariably produces caries. (B) After settling produces caries and pyorrhea. (C) Common example of above vicious dentistry; rubber or gold stringer with fitted clasp. (D) Ditto seen from above. (E) Proper construction. See Indirect Retention.

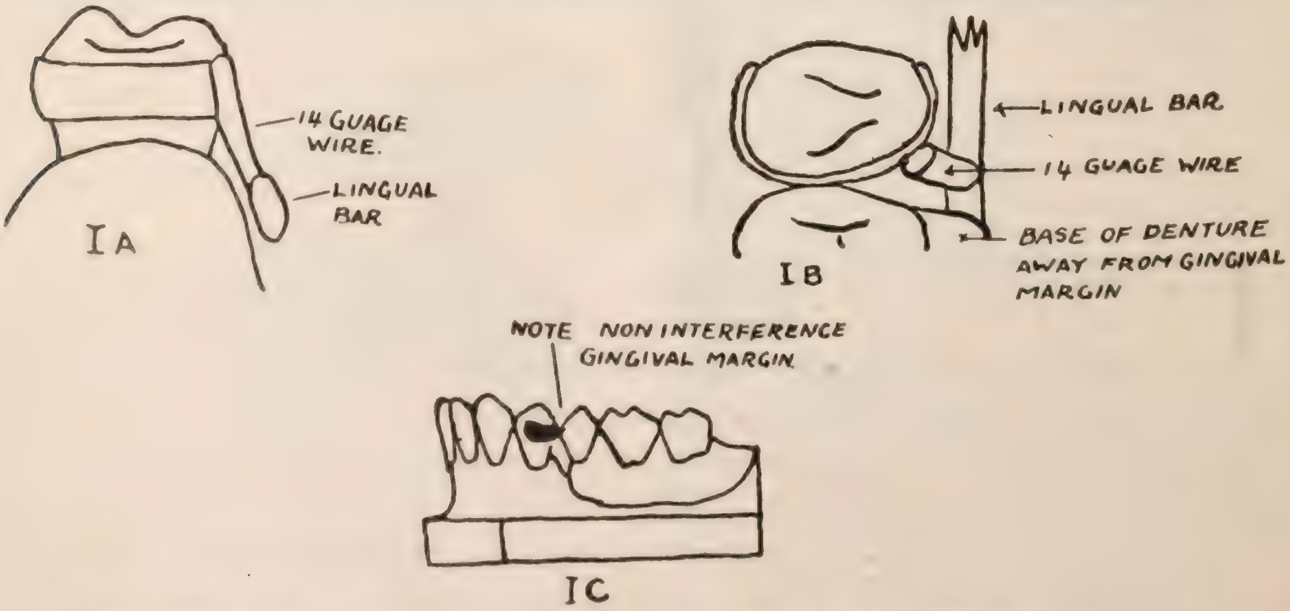

14 GUAGE WIRE.
LINGUAL BAR
IA
LINGUAL BAR
14 GUAGE WIRE
BASE OF DENTURE AWAY FROM GINGIVAL MARGIN
IB
NOTE NON INTERFERENCE GINGIVAL MARGIN
IC

Fig. 1B—Proper construction for above. (A) Proper clasp fitted and contoured to opposing convex surfaces; at point of widest cross-section jointed to base or lingual bar with 14-gauge wire. (B) Showing position of base of denture, bar and 14-gauge wire (latter in embrasure). (C) Side view of above. Note a clear gingival margin. See Fig. 1A.

dentist to cut into healthy teeth, the engineering aspect of the average semi-edentulous mouth, after these preliminaries are disposed of and the remaining teeth and roots are healthy, will show a considerably less number of anchor teeth or roots for the future artificial appliance than heretofore. The writer confidently believes that a glorified descendant of the present "ordinary" partial dentures and fixed bridges (both faulty in so many respects), which might bear the hyphenated name of removable-bridge-partial-denture, or better still, just partial denture, will largely solve our problems for all forms resting on the mucosa, or teeth and mucosa; removable, sanitary, non-irritating to gingival margin, comparatively simple, and therefore inexpensive to construct, capable of modifications in event of loss of teeth or roots, and best of all, well within the reach of the pocketbooks of our patients and the handicraft of ourselves and of our laboratory associates.

Partial dentures may be said to be artificial restorations resting on the mucosa, or mucosa and teeth, and usually retained directly or indirectly by natural remaining teeth, the weight of mastication carried by the mucosa, and in many forms with the assistance of the teeth themselves; this preferable wherever possible, as teeth will bear roughly from six to ten times more stress than the mucosa. Strictly speaking, a bridge, be it fixed or removable, rests on roots only without the assistance of the mucosa, as in the sister science of engineering, in which bridges, in spanning an interspace, rest upon prepared abutments.

A study of partial dentures involves, in addition to certain general considerations, a study of the natural teeth (unaltered or prepared for abutments), presenting most frequently for the retaining force; and the various parts incorporated in the removable artificial parts, such as retaining devices, bases (preferably metal), to which the teeth are connected by the attachment, usually vulcanite; better, gold or porcelain.

GENERAL CONSIDERATIONS

Partial dentures in the years that have passed have acquired a reputation as caries and pyorrhea producers second to none, chiefly from one or both of two reasons. Of these, perhaps the place of honor(?) might be given that peculiar and universally-used and universally-to-be-condemned form of clasp which snugly fits the tooth around the gingival margin, holding by capillary attraction decomposed food in solid and dissolved form in a position on the tooth least able to resist caries, and which, after "settling" of the piece has occurred, adds peridental destruction to caries production. Thus the melancholy cycle proceeds rapidly and surely to destruction of the tooth. The second place on the roll of tooth tissue destruction may be safely given to that unfortunate form of saddle, or mucosa-touching element which, be it gold or vulcanite, is carried high on the lingual margin of the tooth, covering and riding up and down, and irritating the gingival margin also to its sure and rapid destruction. *Figures* 1 to 3. Concerning the pathology, Dr.

Harold Box, of the Department of Pathology, Royal College Dental Surgeons, says in part:

"The attitude of the dental profession today toward the preservation of the gingivæ shows that this subject has become one of vital interest to all of the better class of men in the profession. We know that this tissue is the place of origin of serious pathological conditions which are attracting a great deal of attention today from practitioners in general medicine and surgery.

"Examinations of histological sections showing the gingiva in its proper relationship to the surrounding tissues, shows that this tissue is

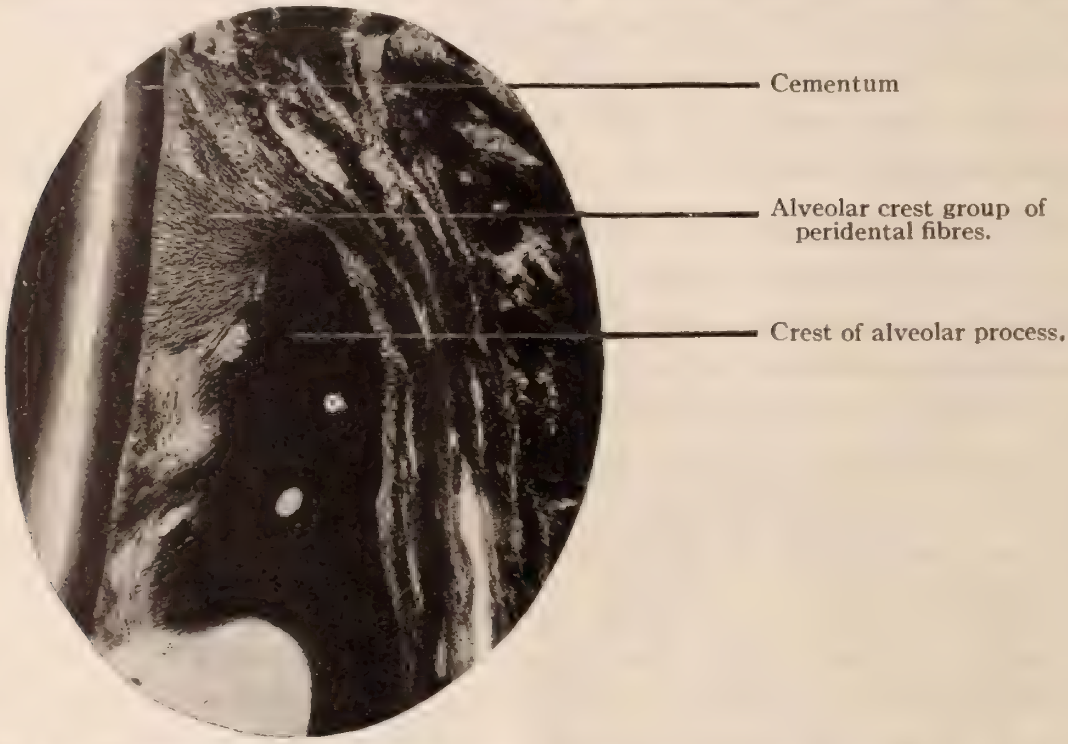

Cementum
Alveolar crest group of peridental fibres.
Crest of alveolar process.

Fig. 2.—Showing crest of the alveolar process and alveolar crest group of peridental fibres (normal). (Box)

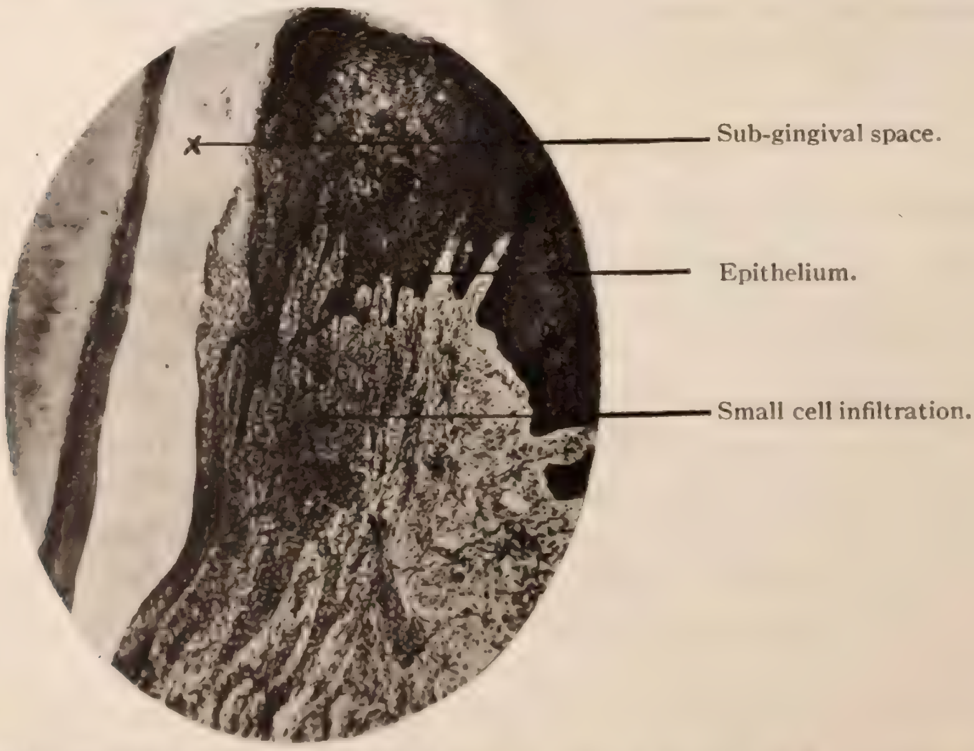


Fig. 2A—(Same section as Fig. 2, closer to surface) showing inflammatory condition in the free gingiva on the inner side. First stage following clasp, base, etc., irritation. (Box)

divided into three parts—the body, the free gingiva and the septal gingiva. We can see in a glance its close relation to the peridental membrane and the alveolar process. The body rests on the alveolar process, and is attached to it by the fibres of its periosteum. It is attached by the first group of fibres of the peridental membrane, known according to Black as the free gingival group, to the roots of teeth at their gingival portion. The free and septal gingivæ rise from the body and surround the enamel of the crown of the tooth at the gingival. The space between the enamel and the free gingiva which covers it is known as the sub-gingival space.

"Where a clasp, on account of settling or from other causes, has come to the depth of the sub-gingival space and has impinged on the peridental membrane, an intense irritation is set up. An increased supply of blood to the part follows, and inflammation is established. Deposits of fermenting and decomposing food are rarely absent, this giving an added irritation and caries production under the most favorable circumstances. Infection follows, and part of the peridental membrane is destroyed. We know that no alveolar process over any part of the root will remain without a peridental membrane. When this is broken in any part, the alveolar process to which this portion is attached is absorbed.

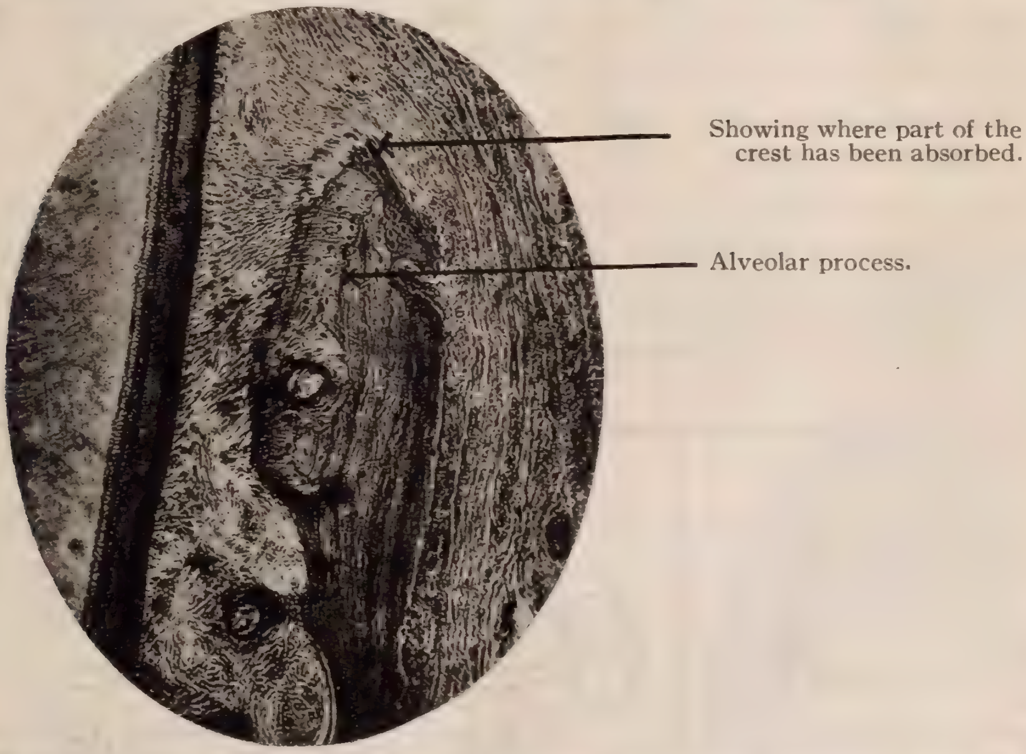


Fig. 2B—Second stage following clasp, base, etc., irritation beginning loss of alveolar process. (Box)

"Again, when any part of an appliance rubs or presses on the gingivæ in such a way as to make an irritation, nature, as in all injuries, tries at once to remove it and sends an increased supply of blood into the dilated blood vessels. To make matters worse, in most cases the surface of the enamel in the sub-gingival space has been etched, owing to the dissolution of the cementing substance from between the enamel rods, by former fermentations. Continued pressure of the free gingivæ against the sharp enamel rods creates an injury to the inner portion of this tissue, greatly adding to the inflammatory and caries-producing condition.

"Nature, being unable to remove the sources of irritation, at once undertakes to remove by absorption the crest of the alveolar process, so that the injured tissues may fall to a new level and return to a state of health.

"The above process continues to one of two endings, either a removal of the offending clasp and saddle and the substitution of a proper clasp and saddle kept in each case well away from the gingival margin, or the certain destruction of the tooth, either from pyorrhea or caries, or both."

The clinical experience of all, as above interpreted, offers a convincing proof of the first and most important essential in design of a partial denture, or, for that matter, any kind of artificial restoration of lost teeth and associated tissues, namely, *the necessity for keeping all parts, be they clasps, bands, half bands, hoods, saddles, bars, etc., away from the free margin of the gum, let alone sinking between the root and the free margin of gum.*

Removability is also a prime requisite, as is skeleton design, using bars of oval stiff wire, joining saddles, united by solder, rather than covering the whole of the remaining vault or gingivæ with metal plate, except in instances in which adhesion is desired as an auxiliary retaining force. (*Figure 15.*) Non-interference with the natural movement of the teeth and roots, as clearly demonstrated by Dr. Herman E. S. Chayes, of New York City, is also a prime consideration in design. The use of interlocking retainers with curved rather than parallel contacts permitting this, and permitting free up-and-down movement of partial denture, following its elastic mucosa-support, the springy character of the skeleton metal construction, and the more or less

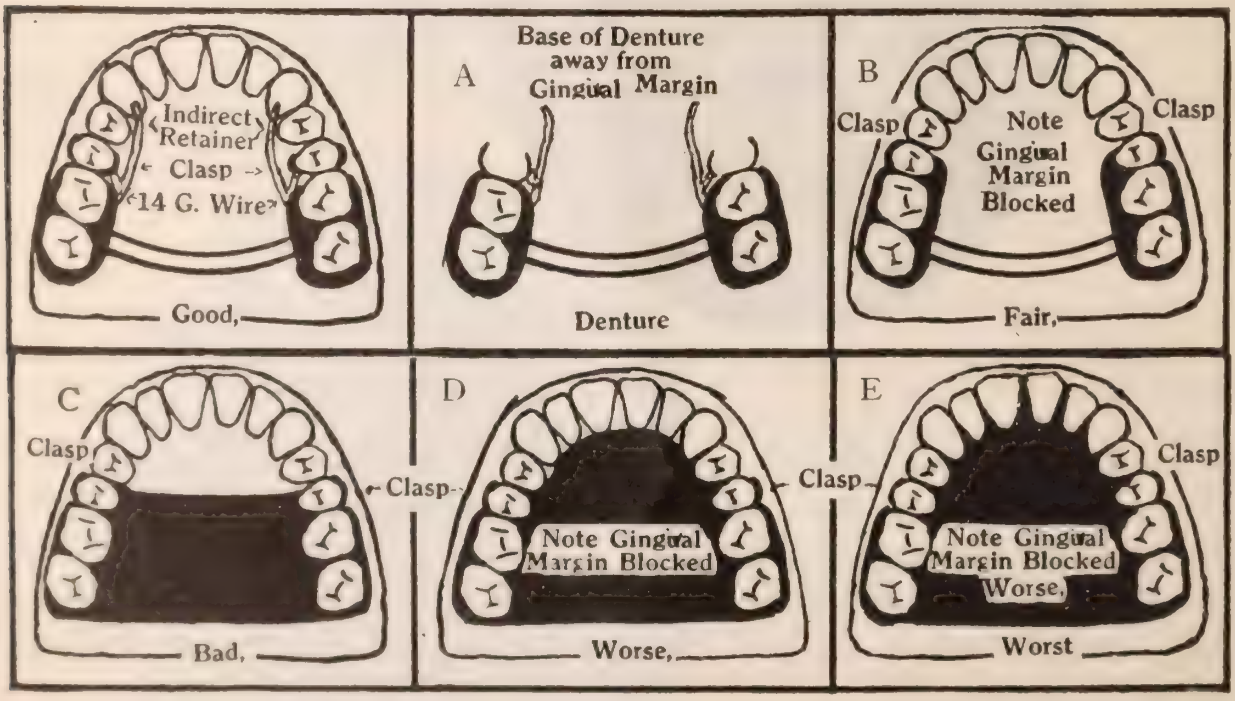

Indirect Retainer
Clasp
14 G. Wire
Good,
A
Base of Denture away from Gingival Margin
Denture
B
Clasp
Note Gingival Margin Blocked
Clasp
Fair,
C
Clasp
Bad,
Clasp
D
Note Gingival Margin Blocked
Worse,
Clasp
E
Clasp
Note Gingival Margin Blocked Worse,
Worst

Fig. 3—Series of designs for identical condition (front ten in, balance absent) of diminishing quality. Note complete lack of gingival interference in 3A and the reverse condition in 3E

cushion-like characteristic of the mucosa, all tend toward this end. Teeth or roots bear roughly from six to ten times the weight that the mucosa will sustain, and the obvious lesson in the design of partial dentures is, whenever possible, rests of 14-gauge wire, curved to prevent slipping away, resting in inlays placed in natural teeth and soldered to saddles, at one or preferably both ends of saddles. (*Figure* 4.) The above contingent with peridental conditions of the tooth or teeth, space for wire, and similar. Also the logical procedure, after the piece is completed and adjusted in the mouth, by careful use of carbon paper and stone, a slight cutting of artificial porcelain which will allow the natural teeth or roots to obtain and carry a larger percentage of stress than artificial porcelain finding its ultimate support on the mucosa. Resultant stress of all kinds during function should be carefully worked out and the design conformed in such a manner as to place no undue stress on any part either of the artificial or natural mechanism. Some examples of the principle will be mentioned later under the captions of Clasp, Indirect Retention, and Anatomical Articulation. Designs should as far as possible provide for the extraction of a doubtful tooth or root and suitable and inexpensive re-adaptation of the partial denture to new conditions.

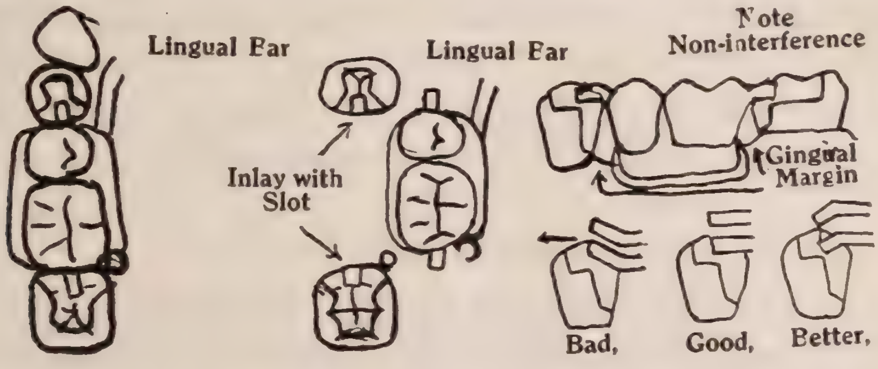


Fig. 4—Rests fitted in inlays, left-hand drawings showing part of a bar lower, upper drawings sectional view of the same. Rests may be assembled on the framework of a denture, the wax pattern of inlay then made, and the denture with the rest or occlusal stud pressed home, allowing the rest to sink into the softened wax at masticating pressure on the denture; or the slot may be formed on the occlusal of the inlay, and the rest subsequently fitted to the inlay on the cast. In the latter procedure, it is advisable not to solder the rest to the framework, but to try in the mouth with the rest attached to the framework in wax only, thus securing a position of ridge-stress, and thus dividing the stress between the saddle and tooth in desired proportion.

EXAMINATION

Probably the first procedure following the initial appointment is the procuring of the history of any doubtful teeth or roots with Roentgenograms of all, as well as a thorough examination into surface and peridental conditions. In event of doubtful success of accepted methods of root-canal or peridental treatment, apical surgery or other known methods in a reasonable time, extraction, curettement, or similar treatment must seem necessary, for no precept of modern dentistry should be more scrupulously observed than that which safeguards the patient's future or present health. Carious recesses should be either excavated or temporarily filled. Any attempt at design of partial dentures while the health of any tooth or root remains in doubt may be subject to such revision as to result in considerable wasted effort.

STUDY MODELS

Quite as necessary to a dentist in the design of a partial denture (outside the extremely simple forms) as the blue prints to the architect or machine builders, are the study models or sketches, or both. Stresses, resulting stresses, methods of retention, direct or indirect, space for constructional parts and teeth, necessity or no for opening bite, tooth or teeth involved if this is necessary, position and size of constructional parts (providing gold against gold, or gold against natural teeth rather than porcelain, avoiding excessive wear), and similar preliminary considerations may be plotted out with reasonable degree of accuracy. Preliminary to this, pencil sketches on a printed or rubber-stamped set of teeth of 14 (*Figure* 5, third molar may be sketched in if necessary) may be quickly made until a suitable design is evolved.

ABUTMENTS

While any lengthy discussion on prepared abutments might seem more relevant to a discussion of crown and bridgework than of prosthetic dentistry, yet, with the increasing use of interlocking retainers soldered to these, the dividing line between these two branches is fast becoming so indistinct as soon to become obliterated entirely, and the writer feels justified in making a brief reference. At the outset, consistent with principles of mechanical efficiency and artistic harmony, each given due proportion in each problem, it may definitely be stated that *natural teeth in every case, be they either for retaining artificial parts in position, or assisting in the stress of mastication, or both, should be utilized, so far as they may be, in their natural and unaltered form.* This being impossible, *nothing further than the absolute minimum of cutting and alteration consistent with correct mechanical principles and future possible pulp affections should be attempted.* This should be remembered quite apart from the considerations of discomfort, liability to future pulp complications, loss of time, and additional cavity margin in the mouth of the patient, and the ever-increasing need of serving a larger number of patients, and serving them well and economically. Our knowledge of root-canal possibilities (and in many cases impossibilities in the hands of the average man) forms a very distinct background upon which this principle

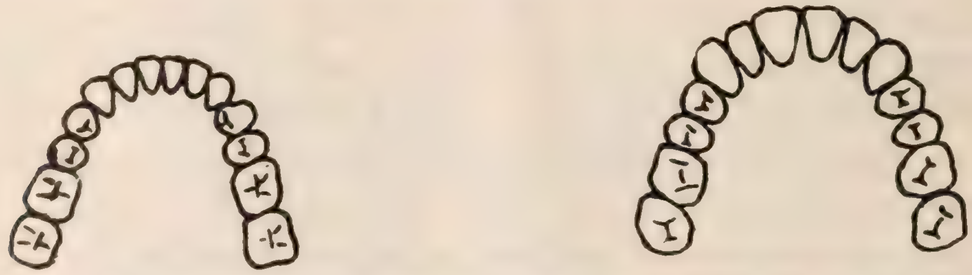


Fig. 5—Form for rubber stamp for tentative sketches. All the designs in this article were worked out from the above forms. Any rubber stamp maker can make a stamp from inspection of above cuts.

stands forth, and gives a new importance for certain methods of retention, fallen more or less into disrepute on account of their misuse in incompetent hands (notably the clasp), as well as furnishing us with another notable series of possibilities given to us with the advent of the cast gold inlay in the direction of the retaining-element-carrying possibilities of these inlays.

Alterations by cutting of natural teeth seeming necessary, *the minimizing of this cutting, consistent with strength, should be always kept well in mind.* (*Figure* 6.) In simpler forms of inlay, the placing of grooves in the inlay against opposite grooves made in the cavity after withdrawal of wax, gives a very decided element of strength against dislodging stresses. (*Figure* 6G.) In the compound forms the use of one, two, and sometimes three pins of 20-gauge metal, located in suitable positions, subsequently threaded to be received into holes also threaded, is of advantage in addition to above. In the MOD forms the opposed groove and occasionally pins and diagonal tapered locking pins assist materially. (*Figure* 7.) The necessity or no for devitalization in these instances is largely a matter of separate consideration depending on such conditions as age, history of pulp, behavior, X-ray information, amount of caries, amount of stress to be borne and similar considerations. More extensive preparations involving pulp destruction seeming necessary, conditions appear more properly embraced under the caption of crown and bridge science rather than prosthetic dentistry. For restoration involving the anterior crowns upon which retaining elements are to be attached, the writer sees no objection to the lingual half band, provided that it is well fitted to a high lingual root portion and kept above the gum margin, which construction affords a decided gain in strength over the non band forms against stress proceeding from the lingual, not to mention a decided minimizing of tooth cutting. For inlay with post, half-hood with post, and similar preparations, a locking screw made from the well-known Howe screw

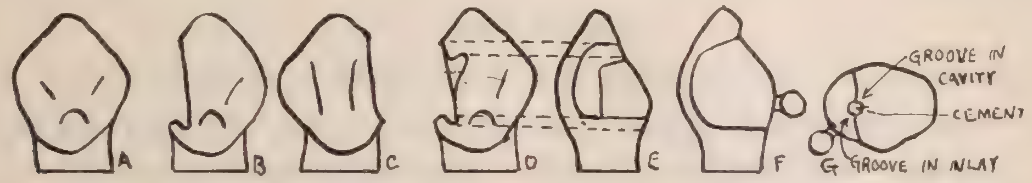


Fig. 6—Short preparation of cuspid for direct retainer element not carrying stress, as Roach, etc. (A) Uncut tooth. (B) First cut, shown from lingual, with knife carborundum stone. (C) Ditto viewed from labial. (D, E) Lingual and side views of next cut, made with fissure bur in the right-angle handpiece. (F) Inlay with Roach ball in place. (G) Showing groove in inlay opposed to groove in cavity wall. (See Fig. 7.)

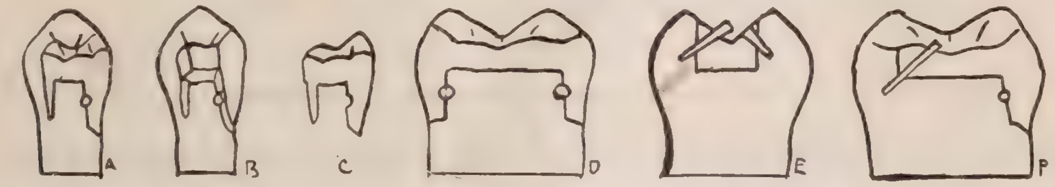


Fig. 7—A, B, C, D, showing use of opposed grooves in inlays in section. E, F, tapered locking pin suggested by Dr. O. S. Clappison, Hamilton, Ontario.

post and accurately fitted after cementation, mechanically provides against movement in the only remaining direction of egress. (*Figure* 8.)

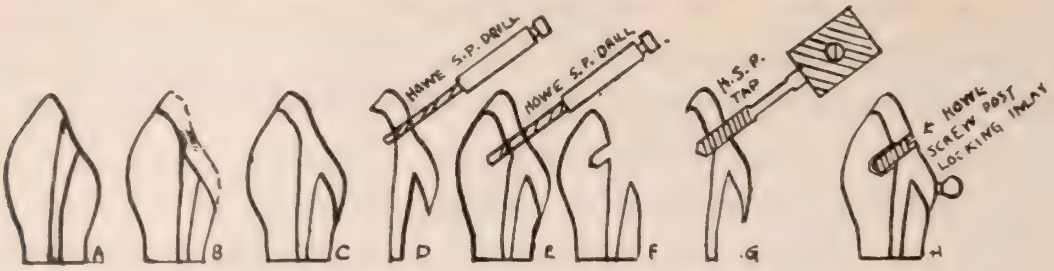


Fig. 8—Steps in construction of lock screw, using inlay and post as example. (A) Preparation complete. (B) Wax pattern and post fitted. (C) Inlay. (D) Hole for locking screw. (E) Ditto in tooth, drill guided by hole in inlay already made. (F) Hole in tooth enlarged. (G) Inlay being tapped. (H) Locking screw in position, turned permanently home while cement is still unset.

RETENTION

Partial dentures are made up of a base, teeth, and attachment, usually vulcanite or gold (soldered or cast), and joining teeth to base, and retaining devices connected with abutment teeth. Retaining devices or forces may be divided into three general classes, one in which the denture is held in its position without interlocking parts attached to teeth, crowns, abutments, etc., such as adhesion, various clasps, cribs, etc.; a second class consisting of special interlocking devices as Roach ball, and split tube, stud, ring and stud, wire and wire clasp (Gilmore), split wire and tube, and others subsequently referred to, and in each case connected with a fixed element attached directly or indirectly to teeth upon crowns, inlays with posts, splints, etc., and in a large number of cases rendering necessary devitalization of teeth concerned for firm attachment. The third, christened indirect retention, is an auxiliary used with either or both of the above. The great advantage of the retaining principle of the first-named class over the special interlocking devices of the second class, particularly in view of our present-day X-ray knowledge of root-canal operations, is easily patent, namely, that of *non-necessity of mutilation of natural teeth.*

SIMPLE RETENTION (DEVICES OF ONE ELEMENT) CLASPS

Perhaps one of the most useful, yet widely abused and maligned methods of retaining artificial pieces in the mouth is the clasp, which, in a vast number of well-chosen, well-designed and adaptable cases is pre-eminent over all of our newest and most effective forms of inter-locking devices in this one

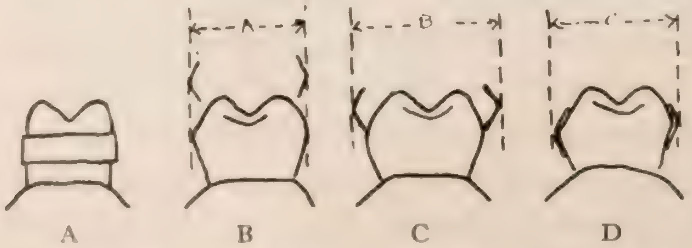


Fig. 9—Rationale of proper clasp action. (A) Tenso friction only, less favorable type. (B) Bell-shaped type most favorable. Free ends of concaved clasp approaching opposed convex surface of tooth. (C) Spreading of free ends of clasp to pass the point of widest cross section. (D) "Snapping" of clasp into position, as its free ends assume the same separation as in B.

respect of greatest importance in view of our knowledge of root-canal possibilities (and impossibilities), namely, the non-mutilation of either teeth or pulps. In conjunction with an indirect retaining extension, of which reference will shortly be made, saddles of considerable length may be held firmly in position, supported by a single clasp at one end of the saddle only.

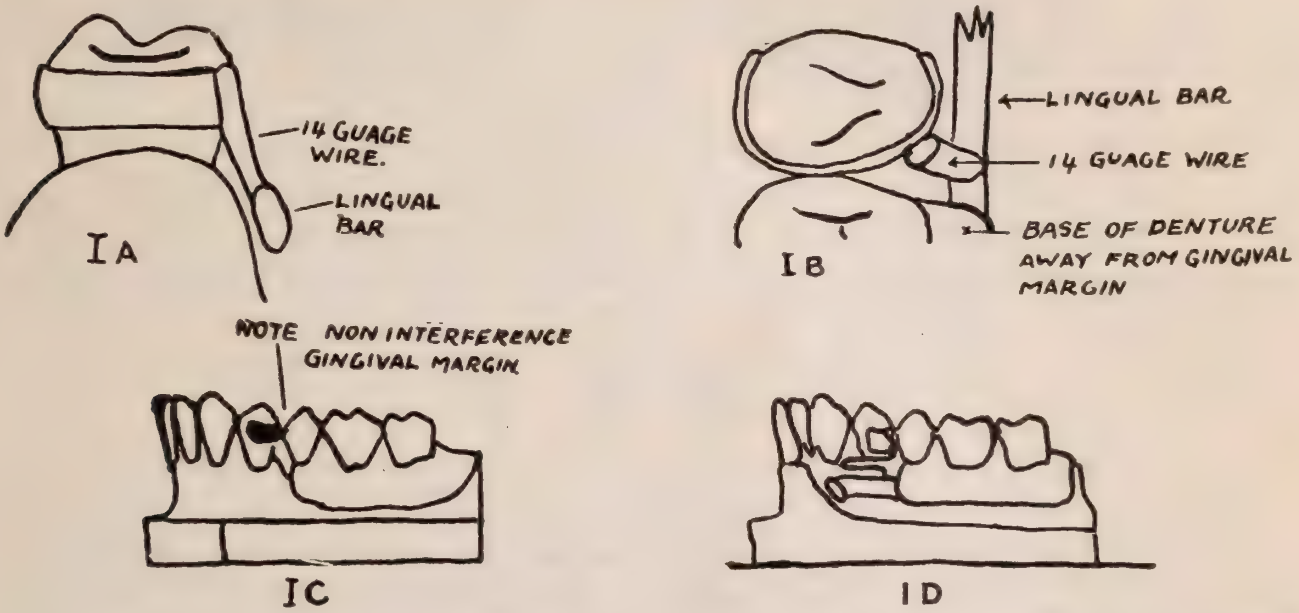

14 GUAGE WIRE.
LINGUAL BAR
I A
LINGUAL BAR
14 GUAGE WIRE
BASE OF DENTURE AWAY FROM GINGIVAL MARGIN
I B
NOTE NON INTERFERENCE GINGIVAL MARGIN
IC
I D

Fig. 10—Proper construction of clasp. (A) Proper clasp fitted and contoured to opposing convex surfaces. At point of widest cross-section joined to base or lingual bar with 14-gauge wire. (B) Showing position of base of denture, bar and 14-gauge wire (latter in embrasure). (C) Side view of above. Note clear gingival margin. (D) Sectional lingual view of a spring connection between clasp and base suggested by Louis J. Weinstein, New York City.

RATIONALE OF CLASP ACTION

While the rebound or spring of clasp against the tooth in setting up a friction is an important factor in clasp action, and all important in the case of a more unfavorable type of tooth, namely, with parallel sides, yet the most effective clasps which go into position with that "snap" so grateful to the patient, are those which mechanically conform to the slight "bell" shape of the crown of that type of tooth peculiarly well fitted for clasp action. It may thus be noted that in order to attach or remove a formed band clasp from such a tooth, its free ends must be sprung apart to a distance proportional with the bell shape of the tooth, thus ensuring a mechanical locking of the clasp in position. (*Figure* 9.)

USE AND ABUSE OF CLASPS

The long bicuspid, molar or even cuspid tooth (in order of preference), of good peridental condition at the end of a series and of more or less bell shape *well above* the gingival margin, are teeth well suited to clasp. A clasp fitted to one such as above, carried almost three-quarters the circumference of the tooth, *the lower margin of the clasp kept well above the gingival margin, and joined to the base by 14-gauge flattened platinum and gold wire or 18-gauge curved or springy wire (Weinstein) soldered to it and to the base.* (*Figure* 10.) The writer desires to lay special emphasis on the necessity of accurately shaping the clasp. A tinfoil pattern (*Figure* 11), a Melotte's metal cast of the tooth, from individual impression in plaster, free use of the contour pliers and riveting hammer are necessary to secure the result desired, using 24-gauge clasp metal plate. Following this plan, many teeth heretofore considered unfit for clasps, as lower first bicuspids, cuspids, occasionally upper cuspids, may be effectively used, provided *opposing convex surfaces may be found and free ends of concaved clasp fitted to these.* (*Figure* 12.) A clasp should be made of suitable stiff metal, cut to pattern, platinum alloy preferred, and should be sufficiently wide to allow bulk of metal to ensure springiness (not less than 3 mm.), in order to secure the maximum efficiency obtaining from the concaved free ends of clasp pressing against opposite convex tooth surfaces. And most important of all, neither the clasp nor the base must ever touch, much less impinge on the gingival margin, a construction which may be remedied in 95 per cent. of partial dentures now constructed by using the three-quarter clasp with 14-gauge wire to join to the base; a construction in nowise interfering with the health of the tooth and the surrounding tissues. (*Figure* 10.) For short teeth, a narrow, thick cast clasp is indicated containing sufficient metal to give same grippy action as wide clasp on tooth. (*Figure* 13.) On the other hand, the misuse of the clasp, upon short, unsuitable teeth, or such crudities as the flat clasp close to the gingival margin, encircling a little more than half the buccal surfaces and merging into rubber carried high upon the gingival margin (*Figure* 14A); the shaped clasp following the gingival margin (*Figure* 14B); the band clasped between

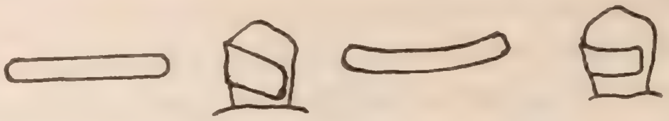


Fig. 11—(A) Usually a soft metal pattern for a clasp cut from a parallel straight-sided piece of metal, when adapted tends to turn gingivally. (B) When curved as above follows the gingival margin about parallel distance.

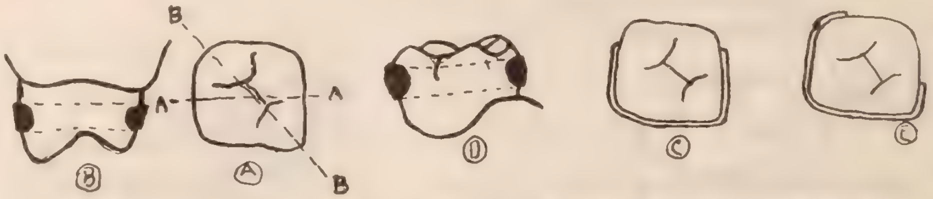


Fig. 12—Choosing suitable opposed surfaces of the same tooth for a clasp. (A) Showing different opposed surfaces AA and BB. (B) Side view of opposed surfaces at AA, unsuitable for clasp as pressure of free ends of clasp tends to throw clasp off tooth. (C) Same as B viewed from above. (D) Side view of opposed surfaces BB, suitable for clasp. Opposed convex surfaces to which free ends of clasp are concaved and fitted. (E) Same as D, viewed from above.

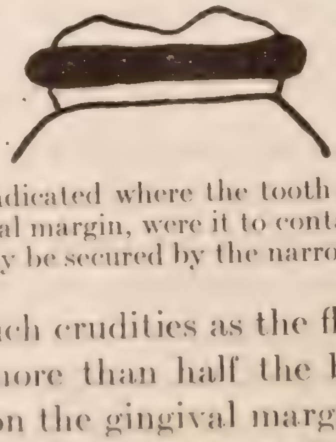


Fig. 13—The cast clasp is indicated where the tooth is so short as to require a band so wide as would sink below the gingival margin, were it to contain sufficient metal to give it spring. The same gripping spring action may be secured by the narrow thick cast clasp.

two short teeth with base high on lingual blocking the free flow of saliva (*Figure* 14C); clasps which do not allow for "settling" of a denture (*Figure* 14D), and which, cutting into the gingival margin after a short period of use, clasps without lingual support, pushing the teeth lingually (*Figure* 14E), clasps on teeth with lingual or buccal lean, pushing the teeth lingually or buccally on pressure of mastication (*Figure* 14F), clasps above or below the widest cross-section, pushing the denture or the tooth out respectively (*Figure* 14G), all result in a sequence of events tending toward the destruction of the tooth, attacking both the tooth itself and its very foundation in the alveolar process. *In this connection it might be said that the vulcanite clasp, carried around the gingival margin of the tooth, as well as the vulcanite or gold "stringer"* (*Figure* 10) *fitting usually the lingual surfaces of the anterior remaining teeth, have no place in dentistry.* Similar in action is the Jackson "crib," primarily designed as a retainer in Dr. Jackson's system of removable orthodonita appliances, and later appropriated for prosthetic purposes, and useful it is in certain instances where a connection is desired in the middle of a series of properly-formed teeth without any cutting.

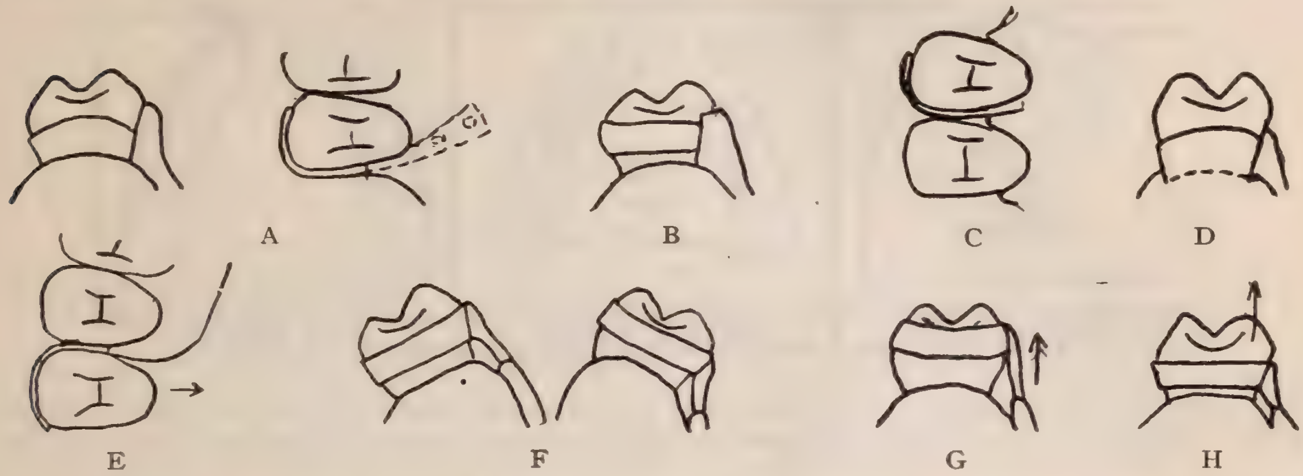


Fig. 14—Various misuses of clasp and base. (A) Flat clasp merging into base, latter high on lingual side of tooth and interfering with gingival margin. Shown viewed from side and from above. (B) Fitted clasp close to gingival margin. A particularly frequent and vicious form. (C) Clasp fitted between two teeth, blocking flow of saliva and increasing tendency for caries and pyorrhea. (D) Clasp after "settling" adds pyorrhea to caries production. (E) Clasp on one side only, pushes tooth lingually. (F) Clasps fitted to teeth of buccal and lingual lean resulting pressure of mastication forces teeth in or out. (G) Clasp above widest cross-section pushes clasp off. (H) Clasp below widest cross-section tends to push tooth out.

ADHESION

While the force of adhesion, of prime importance in edentulous cases, is of secondary importance in partials, yet, in certain cases in which its use would relieve the few remaining teeth of undue strain (*Figure* 15), its importance is considerable. The original Greene method of securing impressions in such a case, modified by Supplee, using Kerr's compound, is as follows: Trays avoiding the muscle contraction, and, if necessary, the sectional method, allowing the impression of all but the labial surfaces of the teeth to be returned to the mouth with softened edges for muscle trimming, until the impression passes a test for adhesion by remaining in position while the patient makes dislodging movements. The subsequent adjusting of a separate piece of compound representing the labial surface, and finally the return of the impression to the mouth, covered with a thin mix of plaster, also with muscle movement adding to the result the accuracy of a plaster impression and drawing off any crowns, posts, copes, etc., in their exact relationship, will secure the highest degree of adhesion previous to compensation of the hard area mentioned later. In this connection, the study of impression methods for partial restorations would well fill a separate essay.

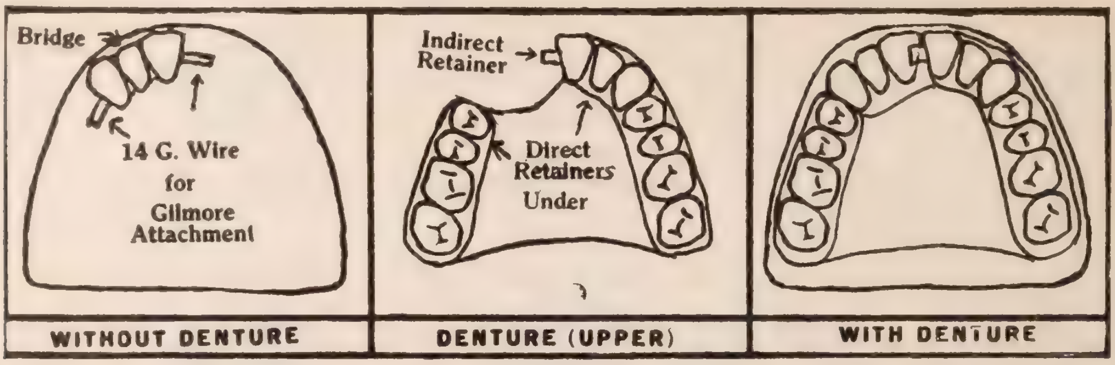


Fig. 15—An instance in which adhesion is used to relieve the strain on the anterior three teeth. This not being necessary, skeleton construction might be used. (See Figs. 20, C, 2, C, 3.)

Adhesion depends on molecular attraction between a film of saliva and the base on one side and this film and the mucous membrane on the other, held in this position by capillary attraction. Capillary attraction is lessened as the approximating surfaces become separated (*Figure* 16), therefore it is especially necessary in securing high adhesion to preserve close contact at the periphery, avoiding, however, muscular contraction. It is patent also that the amount of adhesion is in direct proportion, not only to the accuracy of the adaptation, but also to the area of adaptation. Therefore the diminishing importance of adhesion in small saddles. The above-mentioned technic seems to the writer the most scientific method of securing adhesion of maximum efficiency and in harmony with physical laws.

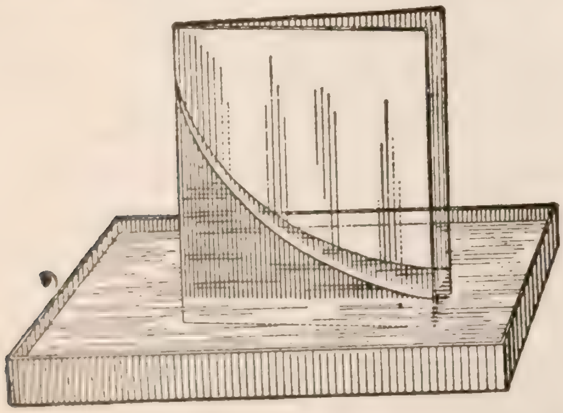


Fig. 183—Water rises between the two plates of glass which touch along one edge.

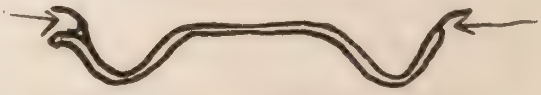


Fig. 16A—In denture construction the lesson of above experiment is accurate, adaptable at periphery. As the base and the mucosa tend to separate, likewise the capillary film becomes lost, and with it adhesion.

Fig. 16—Figure 183, from "Ontario High School Physics," showing the increasing quality of the capillary film as approximal surfaces approach one another.

TREATMENT OF HARD AREAS

In the median line is found in most upper mouths the only portion of the mouth which it is said never changes, usually harder than any other portion of the mouth. In constructing bases which cover part of the so-called hard area, cognizance should be taken of the fact that the central area is practically unchangeable while the balance is to a small degree subject to

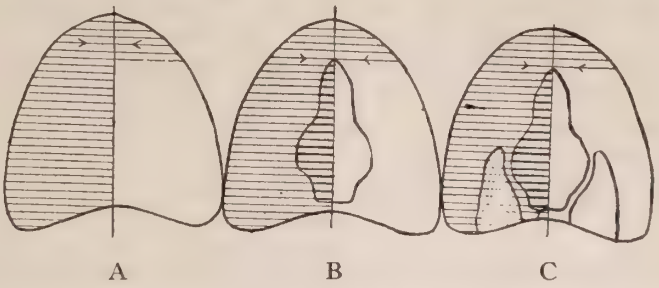
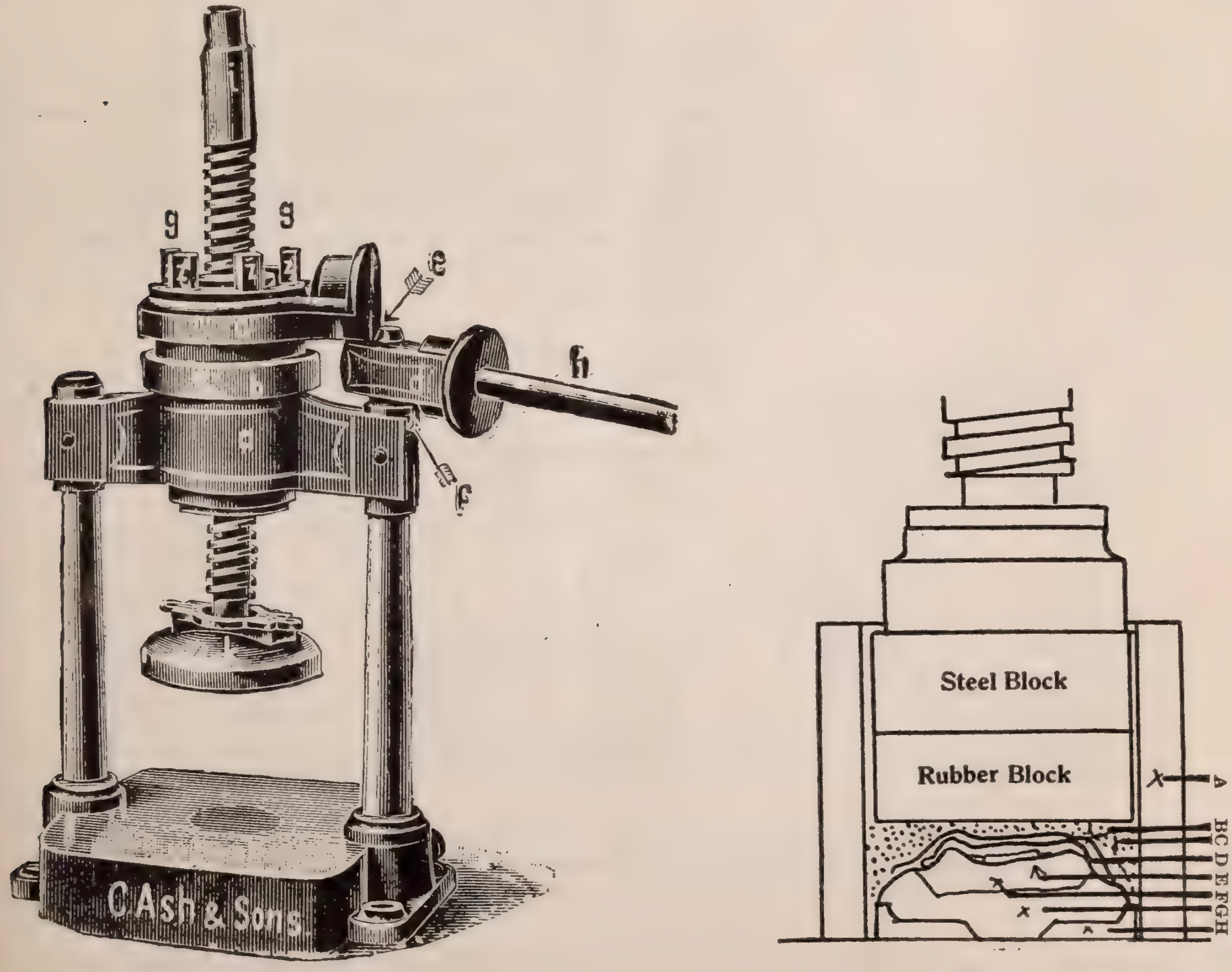


Fig. 17— (A) Uniform density. (B) Hard area in center, balance uniform density. (C) Hard area in center, soft area on either side, balance uniform density.

In examination of mouth for hard and soft areas, the cast of the upper mouth and a lead pencil being close at hand, a round-headed instrument is held lightly in hand and drawn across the vault as indicated by cross lines, one side at a time from ridge to median line. In vault A no difference of density is encountered; in vault B the instrument climbs up a hard area outlined in center; in vault C hard area in center and soft area on either side are detected, each noted on cast as detected.



(A)

(B)

Fig. 18—(A) Deutscher Differential Press of C. Ash & Sons, London. Note double leverage exerted on screw resulting in high pressure on block. (B) Showing re-swaging process in section. The writer uses a steel tube cut from a solid cylinder of steel, with walls 5-8 inch thick (A), instead of the cast iron cup provided with the press. The flask or oiled circular plate

(H) in which the Spencer Plaster Compound cast (F) is bedded (G), occupies the bottom of this. Next comes a sheet of thin lead (E), cut to the shape of the hard area (Fig. 17), next the base to be re-swaged, then a sheet of rubber dam(B), then a quantity of finely divided rubber (B), over this the rubber block (hard) and steel pressure block. The use of finely divided rubber is a distinct advantage over the use of the rubber block alone, resulting in better adaptation at the periphery of the base to be re-swaged, due to the more fluid-like characteristic of the divided rubber over the solid block. The swaging complete, the steel tube (A) and its contents can be moved off the press over a box or drawer, and the whole contents dropped through the bottom and recovered. Should the box or drawer in which the finely divided rubber is kept be some little distance away, a piece of sheet metal should be used under the tube (A) enabling the tube and its contents to be carried without spilling.

(See article in *Review*, August, 1914, Dr. H. J. Goslee.)

change. This may be done in the case of a saddle covering all or a considerable portion of the vault by plotting out on the model from a careful examination of the vault (*Figure* 17), the outline of the central hard area on the cast and subsequently re-swaging the base (Ash press) upon a piece of soft lead from 16 to 24 gauge (depending on the amount of the difference of density between the hard area and the rest of the mouth). (*Figure* 18.) This at first results in a small recess above the hard area upon which the base loses contact, and therefore adhesion, which is partly made up by the outside pressure on the rarefied air within, and after "settling" is complete, contact in that area is restored, with subsequent adhesion by contact with capillary film of saliva.

SINGLE STUD

A stud is a positive retaining device, used commonly in conjunction with other retaining devices located on the opposite side of the mouth, and consisting of a projection of slightly inverted cone shape of about 14-gauge (Brown & Sharpe), and about 3mm. long, which engages in a recess in an inlay, crown, bridge, dummy, or similar. (*Figure* 19.) Is usually used with dentures having a loss of teeth on one side only, and in conjunction with a rest or indirect retainer, is made to engage in a horizontal direction in the hole or recess, then on the other side with other attachments, such as clasp, Roach, Gilmore, etc., the saddle slipping home in a vertical direction. The

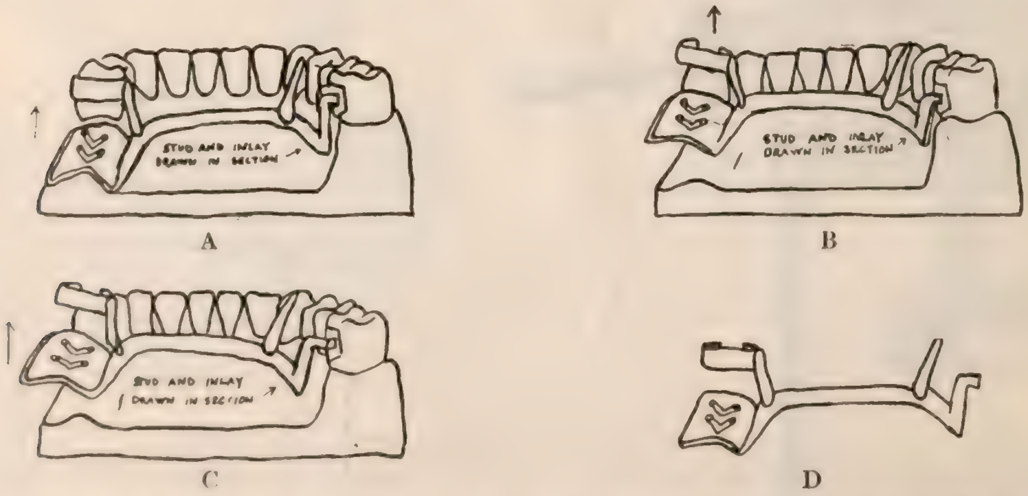
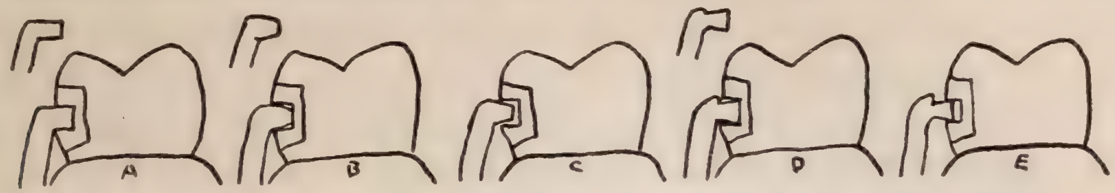

STUD AND INLAY DRAWN IN SECTION
A
STUD AND INLAY DRAWN IN SECTION
B
STUD AND INLAY DRAWN IN SECTION
C
D

Fig. 19—(A) Framework in position. (B) First step in removal, clasp raised. (C) Second step, clasp free of bicuspid, piece moved laterally disengaging stud. (D) Framework. (N. B.—Insertion done in reverse order, stud placed first, then clasp.) Inlay shown in section.

removal of the piece is made in reverse order, pulled away part vertically and then horizontally, disengaging the stud as per example.



Bad. Fair. Good.

Fig. 19A—Proper shape of stud. (A) Cylindrical stud closely fitting a cylindrical hole. does not allow other side of denture to pass other retainers (Fig. 19B) without dislodging inlay, (B and C) Cone-shaped stud. Fair only, as allows play when stud is not perfectly seated. (D and E) Inverted cone form good. No play in any position of stud.

RING AND STUD

In certain cases, such as those in which the attachment is desired on a shell crown, half-hood, or similar comparatively thin covering on the lingual side of a tooth, the process may be reversed and a stud soldered thereunto upon which a ring may be engaged. This has an advantage also in the case of elderly persons and persons of poor sight, enabling them more easily to "find the place," but should be used only on very well retained inlays as the dislodging movement may be too great, due to leverage. (*Figure* 20.)

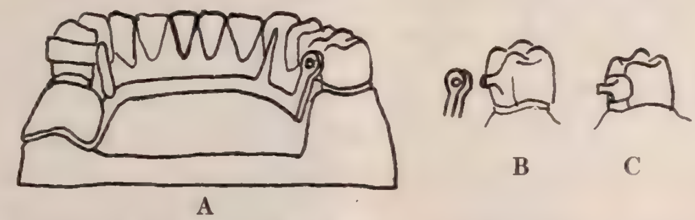


Fig. 20—Ring and stud (reverse of Fig. 19). Stud soldered to crown (B) and recess for this in a ring, mounted on framework. Do not use in inlay unless large MOD or similar, for possibility of binding and dislodgment of inlay (C).

DOUBLE STUD

In occasional cases studs may be opposed to one another to advantage, the appliance being removed by springing the studs together, thus releasing

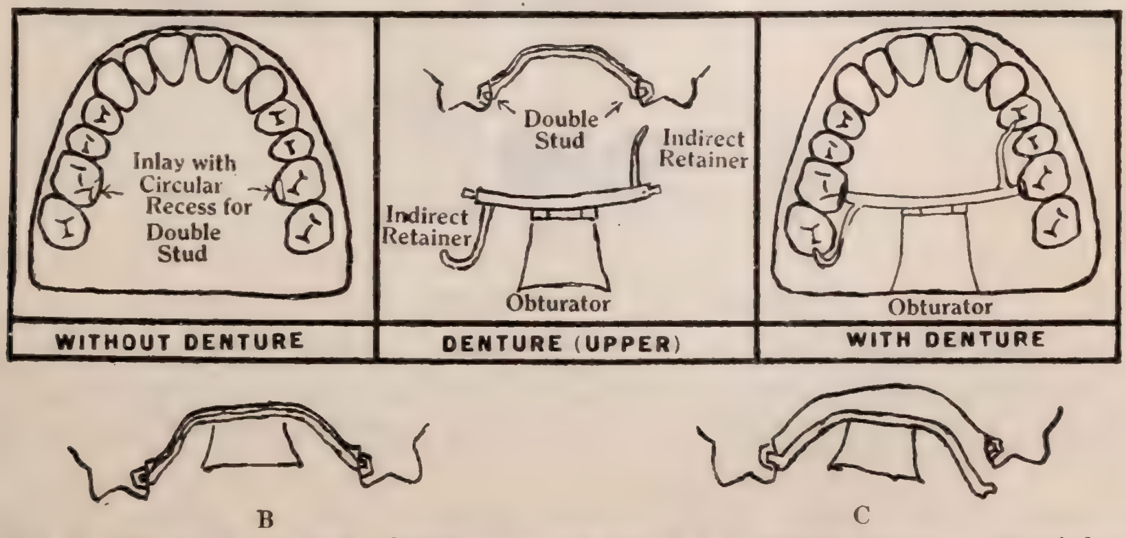


Fig. 21—Showing use of the double opposed stud in an obturator frame. Two inlays with circular 14-gauge recesses are made for the lingual surface of the molars. A piece of flattened 14-gauge platinum and gold wire is arched across the palate (B), and armed at each end with a stud, upon this is attached the obturator hinge. The piece is removed by springing one of the studs lingually (C) in releasing the piece, and the insertion is accomplished in reverse order, one stud engaged first, then the other sprung into position. (See Fig. 27, Base B6 and B7.)

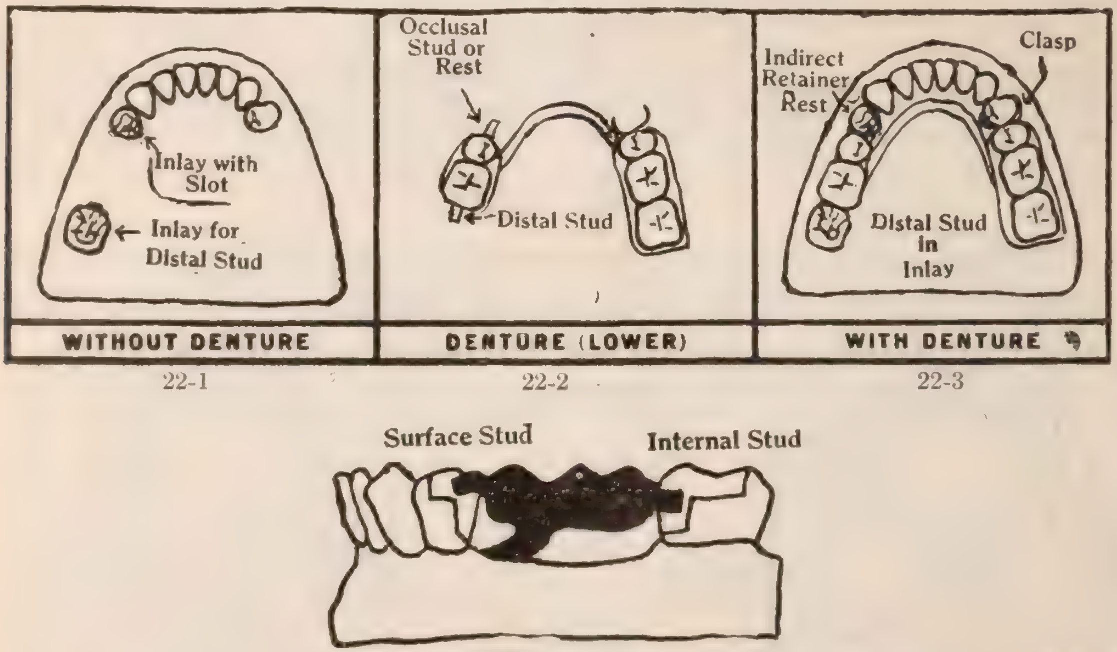
the piece. A very good example is a simple retainer for an obturator (*Figure* 21), in which two inlays with recesses were made on the lingual sides of both the upper first molars and an arch of 14-gauge wire rolled flat and armed on each end with a stud, and with mesial and distal rests preventing rotation. This springs in and out, providing a very satisfactory attachment for an obturator, with the cutting of only two inlay cavities on the lingual side of the upper first molar.

MESIAL OR DISTAL STUD

A very neat, efficient and sanitary restoration may be made in cases involving a space, on one side of the mouth with good teeth at both ends of the space, and on the other side a space with a tooth at one end only, as per *Figure* 22. A stud is fitted in a *mesial* inlay with a rest on the first bicuspid, while a clasp or similar engages the opposite bicuspid. The piece is held down diagonally opposite with the distal stud and clasp, and the resultant force from the rest engaging in the inlay on the first bicuspid (left) presses the saddle firmly into position. (*Figure* 22.)

COMPOUND RETENTION OF DENTURES (BY INTERLOCKING DEVICES OF TWO ELEMENTS)

This class of retainer involves stationary fixed abutments to which one of the two elements is attached, by solder, such as crown, stationary part of removable bridge, inlay with cr (occasionally) without posts, for which devitalization is usually necessary to secure strength. Absolute parallelism is necessary in the case of the platinum hood and split plate and its various modifications, the tube and split post, the engaging plates known as the Morgan attachment, and similar.



22-1 22-2 22-3

22-4

Fig. 22—Distal stud used in the mesial of an inlay. (22-1) Case with inlays. (22-2) Denture with left distal (internal) studs engaging in mesial recess in inlay, occlusal stud engaging in occlusal slot in inlay in lower left first bicuspid toward mesial. (22-3) Piece in position. (22-4) Sectional view of left side of case.

Regarding this class of retainers accuracy is of paramount importance, and instruments for measuring the distance between the retaining teeth, and calculating from the depth of cavities necessary for the reception of the retainer as well as placing in parallel relations the retainers themselves for soldering as well as for holding the parts themselves during soldering, are available, constructed with all the care and accuracy of high-grade mathematical instruments, for the assistance of the dentist in securing his results. While the study of the use of these retainers of precision (primarily designed for removable bridgework) and the technic involved representing the work of Peeso, Chayes, Ash and others, is particularly relevant to partial dentures, inasmuch as a large percentage of these depend on the mucosa for support with the teeth for retainers, yet properly presented would fill a number of papers. Particularly for short spaces, with a tooth at each end of the space, the above methods produce results unapproached for neatness, sanitation and reproduction of natural contours in artificial work.

The well-known Roach attachment, consisting of a split tube slipping over a ball (*Figure* 22A), while not requiring the absolute parallelism of the foregoing, yet, due to the contact of the two elements being the line around the circumference of the ball only, may be set with quite sufficient parallelism with the aid of special "jigs." The action of the Roach attachment is purely tenso-friction, and also allows for "settling" without placing an undue strain upon the tooth or teeth involved. Carefully placed in the central position in the embrasure (*Figure* 22B), in combination with similar or other means of both direct or indirect retention, a multitude of efficient, sanitary and unobtrusive combinations may be obtained. Attention is directed to articles in Oct., 1915, *Review*, G. W. Coltrin, and July *Review*, F. E. Roach, 1915.

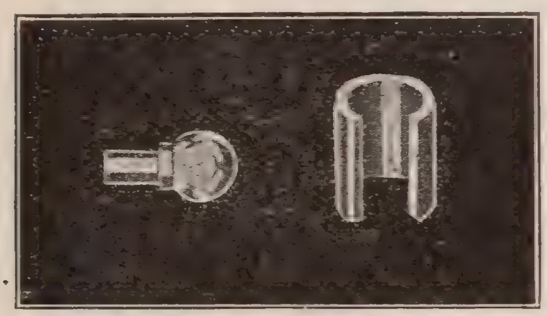


Fig. 22A—Roach attachment.

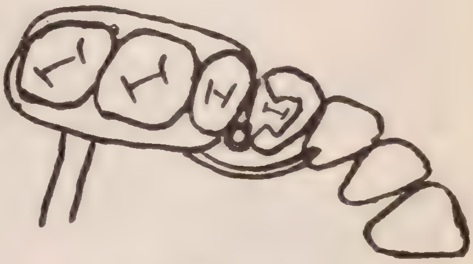


Fig. 22B—Showing proper location of Roach attachment in center of embrasure.

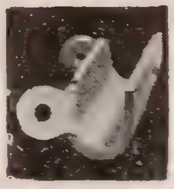


Fig. 22C—Clasp element of Gilmore engaging in 14-gauge platinum and gold wire.

The equally well-known Gilmore attachment (*Figure* 22C), which consists of the 14-gauge wire with the special Gilmore clasp fitting it, admits of some range of application. Some discrimination is required in its use, as any undue settling due to the more or less horizontal position of the wire, is apt to place an undue tipping stress on attached tooth. This undue stress is more apt to come in locations to which Gilmore wire is attached to single teeth. With cases in which the wires span an intervening space between two teeth, or project from each side of one, or more splinted teeth standing alone, the tipping tendency is greatly minimized. In metal saddles this may be largely avoided, provided the ridge is not too flabby, by constructing the saddles with the 14-gauge wire, held to the abutments by wax only, returning to mouth and pressing down, dislodging the 14-gauge wire toward a position of ridge-stress.

INDIRECT RETENTION

This may be defined as the utilization of a force (P *Figure* 25) remote from that part of the denture to be retained, between which another of the

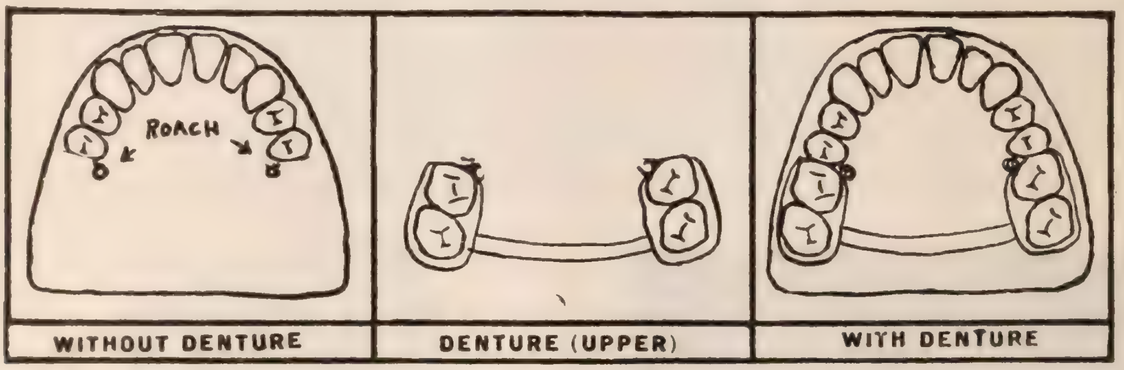


Fig. 23—Indirect retention. As constructed this case would not be a success. Nothing to prevent saddle from dropping at rear.

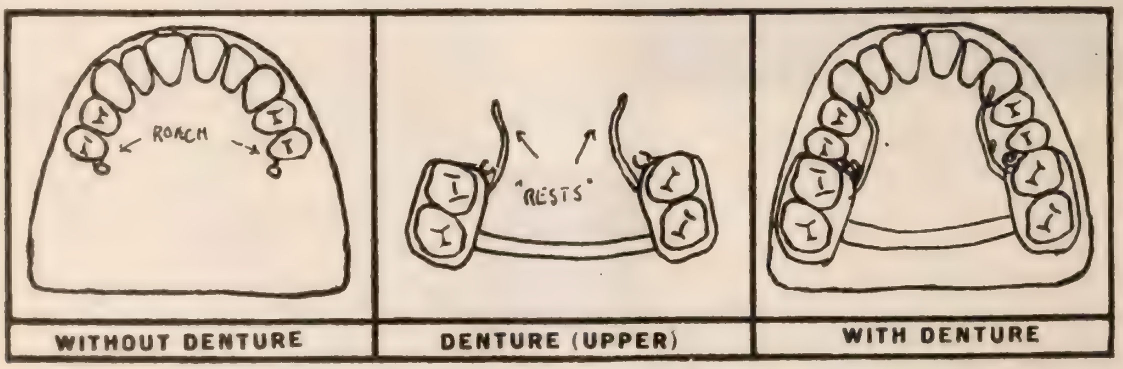


Fig. 24—Indirect retention. With the addition of rests (in center cut), any tendency for the saddles to drop is instantly checked by the rests touching cuspids. (Fig. 25.)

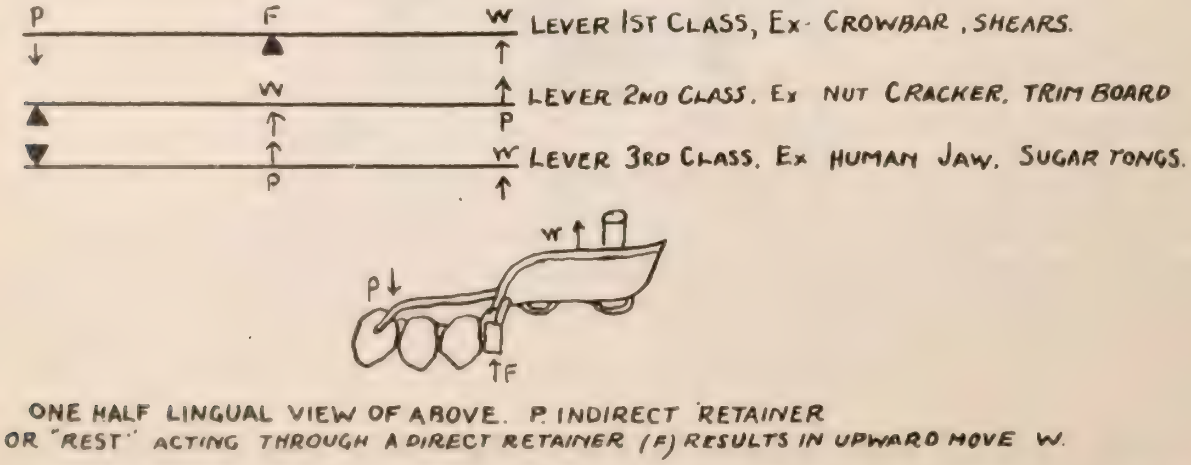
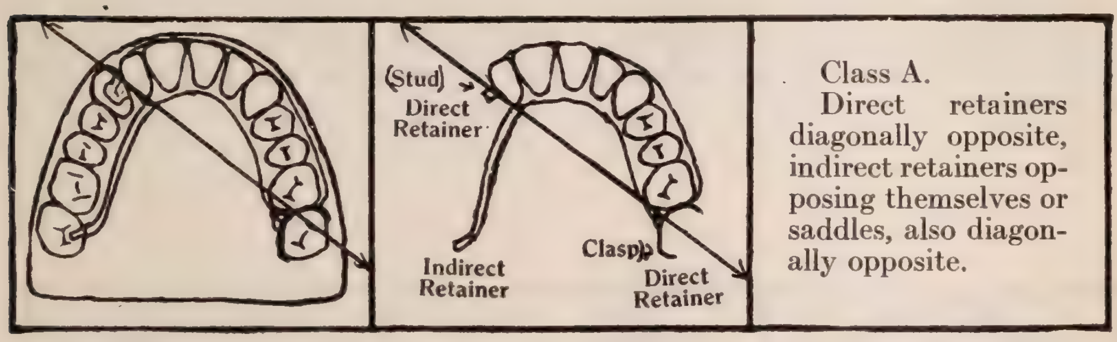

P
F
W
LEVER 1ST CLASS, EX- CROWBAR, SHEARS.
W
P
LEVER 2ND CLASS. EX NUT CRACKER. TRIM BOARD
P
W
LEVER 3RD CLASS. EX HUMAN JAW. SUGAR TONGS.
W
P
F
ONE HALF LINGUAL VIEW OF ABOVE. P. INDIRECT RETAINER
OR "REST" ACTING THROUGH A DIRECT RETAINER (F) RESULTS IN UPWARD MOVE W.

Fig. 25—Indirect retention is an application of the lever of the first class. Lower cut represents a lingual view of one-half of case in Fig. 24. The piece is held in the center (F lower cut) by the Roach attachment. Any downward movement of saddle is prevented by rest passing forward and touching cuspid. Therefore the cuspid, acting on the rest, might be considered as the P, or power, of the lever. The Roach as F, or the fulcrum, and the retaining or upward reaction on saddle as W, or the work of the first-class lever. See upper drawing for levers

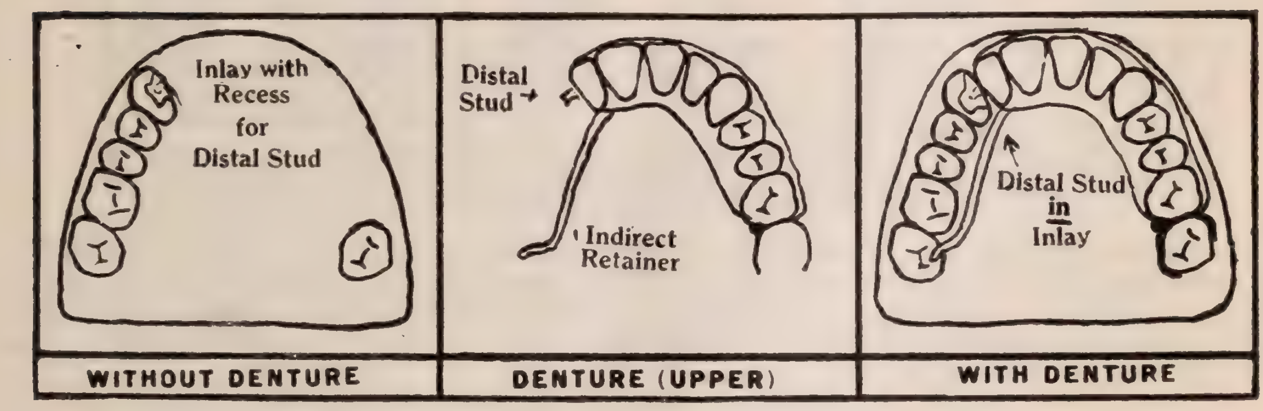
direct forms of retainers is interposed (F), the resultant force (W) tending to seat the saddle more firmly in position. This scheme or system of retention may be used in a great number of modifications, chiefly in saddles with support at one end only. For example (*Figure* 23): As it stands, there is nothing to prevent the saddle dropping down, but with the addition of a "rest" (*Figure* 24), the slightest tendency for the saddle to drop results in an upward pressure of the "rest," the piece being held in the center line by the Roach attachments, and thus with adjustment, an unsupported saddle may be made to press up into its position in excess of that pressure really required.

Class A.—Direct Retainers Diagonally Opposite



Class A.
Direct retainers diagonally opposite, indirect retainers opposing themselves or saddles, also diagonally opposite.

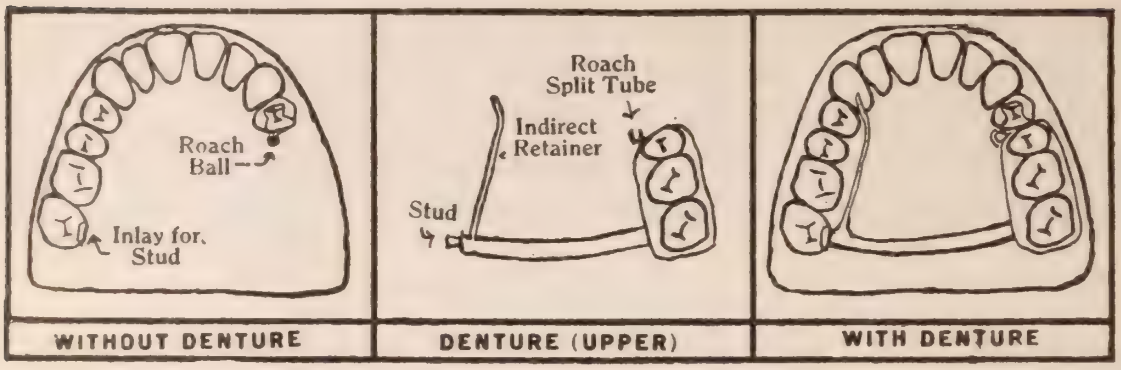
Fig. 26—Example Class A.



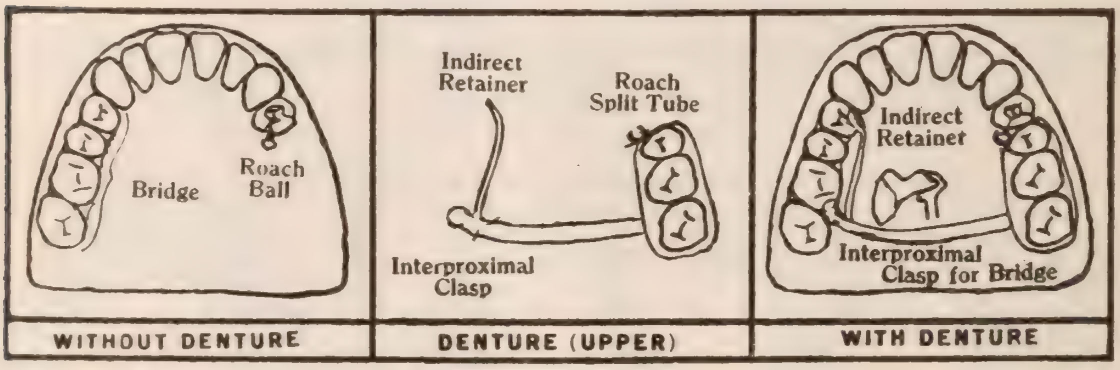
A1—Condition as shown. Preliminary work before impression, inlay with recess for stud (leave graphite in wax) with sprue uncut for convenience in drawing in impression; framework, saddle, with distal stud, indirect retainer and clasp joined to base with 14-gauge wire as shown. Insertion and retention, stud first slips in place, then clasp. Through these direct retainers saddle is held in place by the indirect as shown.

It may be noted that the rationale is a modification of the lever of the first class, in which in this particular instance the power may be likened to the "rest" pressing on the cuspid, the fulcrum, the Roach attachments and the work, the resultant force which tends to press the saddle firmly in position. Here follows a number of examples of cases in which indirect retention is used. It will be noted that only two direct retainers are used in all cases, and that skeleton construction in all cases away from the gingival margin is recommended. (*Figures* 25, 26, 27, 28.)

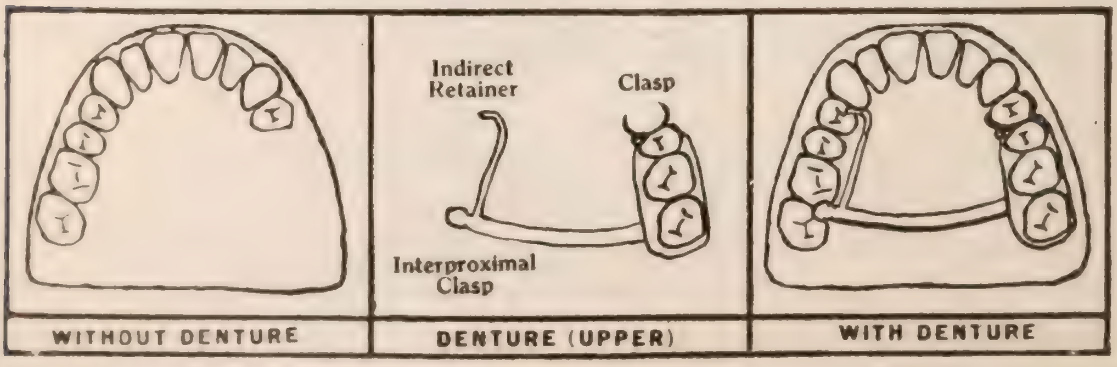
Class A.—Direct Retainers Diagonally Opposite



A2—Condition as shown. Preliminary work before impression as shown in first cut. Framework as shown. Insertion and retention, stud slips in inlay. Roach tube then slips over ball in inlay, acting through these diagonally-placed direct retainers, indirect retainer holds remote part of saddle.

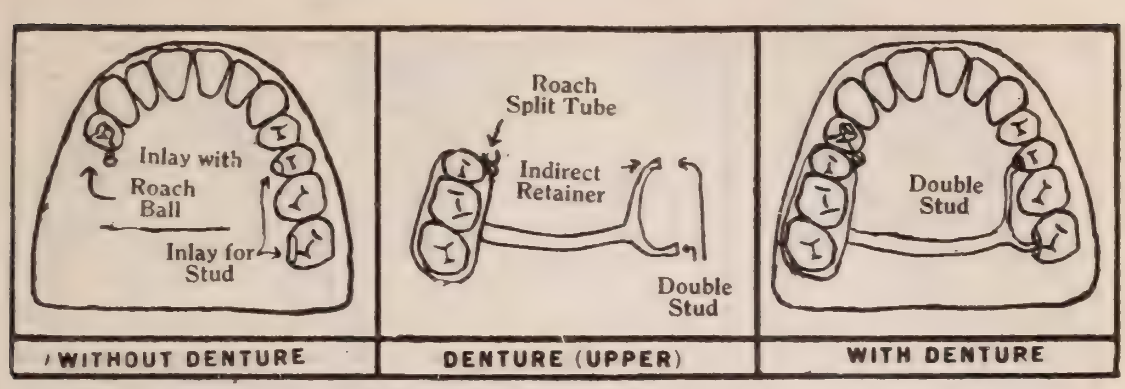


A3—Condition as shown, similar to A2, except bridge. Preliminary work before impression core under bridge, and inlay as shown. Framework as shown (note inter-proximal clasp in right-hand drawing). Insertion and retention, interproximal clasp first. Roach attachment next, through these indirect retainers acts as case A2.

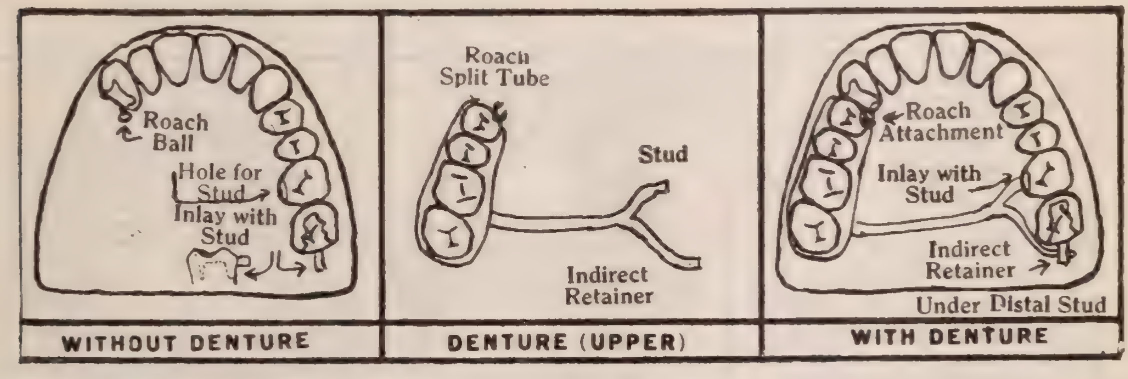


A4—Condition as shown. Preliminary work before impression making, interproximal clasp from wax pattern applied directly to teeth. Framework as shown. Insertion and retention, interproximal clasp in position first, then clasp indirect retainer through these diagonally-opposed direct retainers acts as saddle, similar to case A2 and A3.

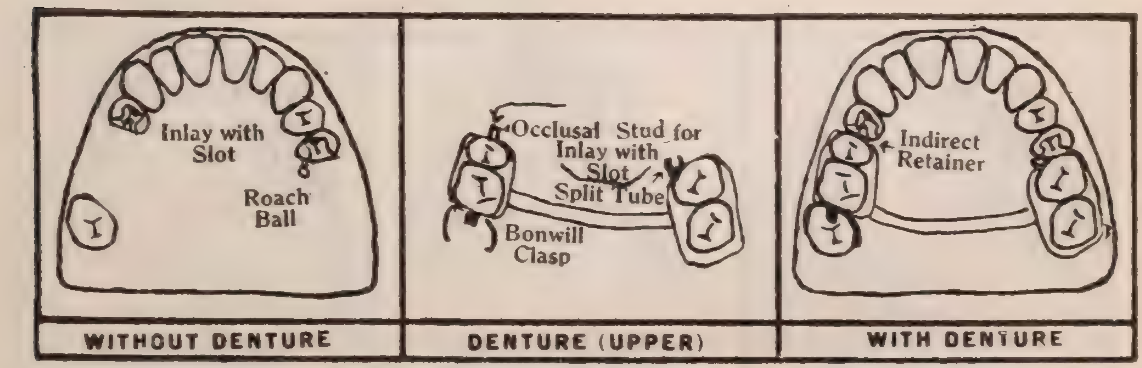
Class A.—Direct Retainers Diagonally Opposite



A5—Condition as shown. Preliminary work before impression, inlays complete (without Roach ball) with sprue left on. Framework as shown. Insertion and retention double stud in inlays first, then Roach tube in ball. Anterior stud indirectly retaining saddle through posterior stud diagonally opposed to Roach attachment. (P. S.—Might be considered as a class B case, considering the anterior stud as a direct retainer diametrically opposed to Roach attachment. (See class B.)

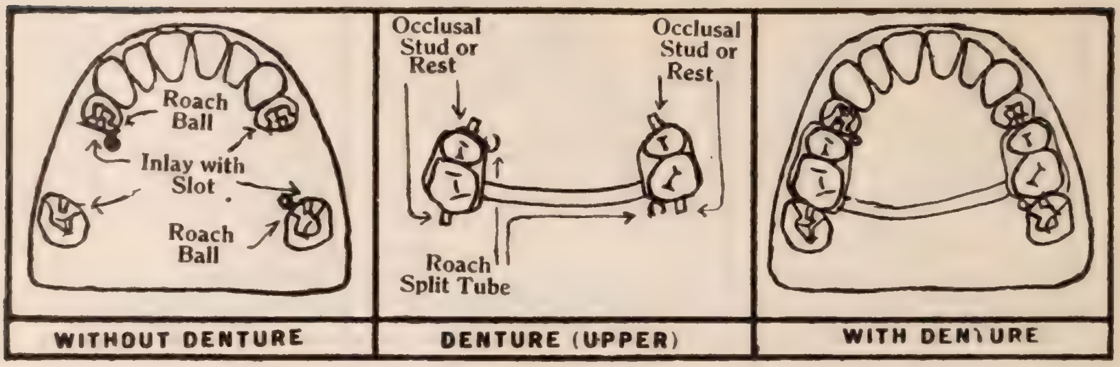


A6—Condition as shown. Preliminary work before impression, inlays without stud, and Roach ball, but with uncut sprue. Framework as shown. Insertion and retention indirect retainer under distal stud, stud in inlay, then Roach split tube over ball. The direct retainers, the Roach attachment and the stud in the lingual inlay on molar act diagonally opposite, and any downward movement of the saddle which is coincident with a downward movement of the indirect retainer is checked by the distal stud on the second molar inlay.

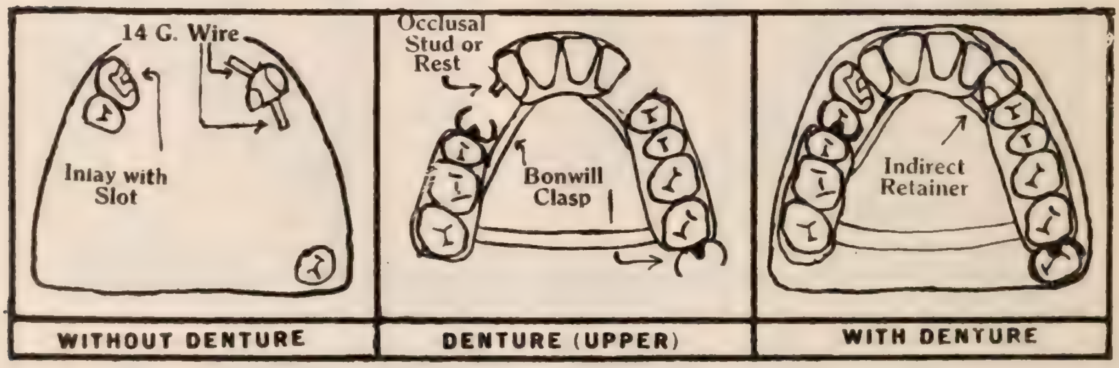


A7—Condition as shown. Preliminary work before impression, two inlays as shown, sprues uncut. Framework as shown. Insertion and retention, goes directly to place, the occlusal stud indirectly retaining the opposite saddle through the Bonwill clasp, and the Roach attachment diagonally placed. Note that the upper right first bicuspid and second molar share the weight of mastication with the mucosa under the saddle.

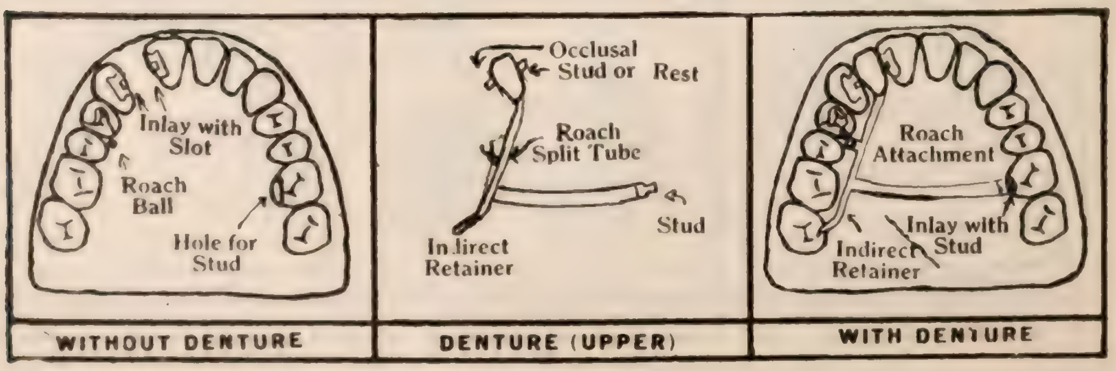
Class A.—Direct Retainers Diagonally Opposite



A8—Condition as shown, similar to A7, except molar on left. Preliminary work before impression. Inlays are shown with slots for 14-gauge wire. Framework as shown. Try in mouth with inlays in place, and occlusal studs held in wax only, to divide pressure between teeth and mucosa. Insertion and retention, directly to place, right distal and left mesial studs indirectly retaining one another through the diagonally-opposed Roach attachments.

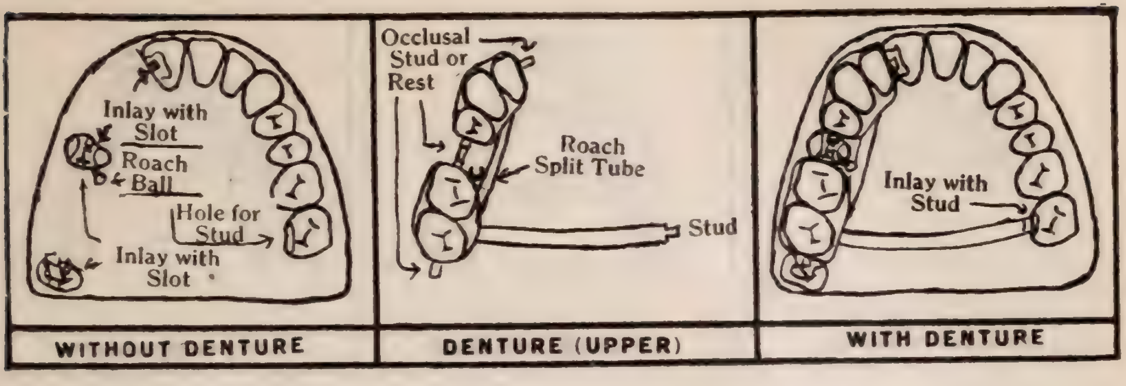


A10—Condition as shown. Preliminary work before impression inlays as shown, with uncut sprue in position. Framework as shown. Insertion and retention, directly to place, diagonally opposed, Bonwill clasps retain directly, mesial and distal wires from left cuspid under saddle indirectly retain right saddle and weight divided between teeth and mucosa.



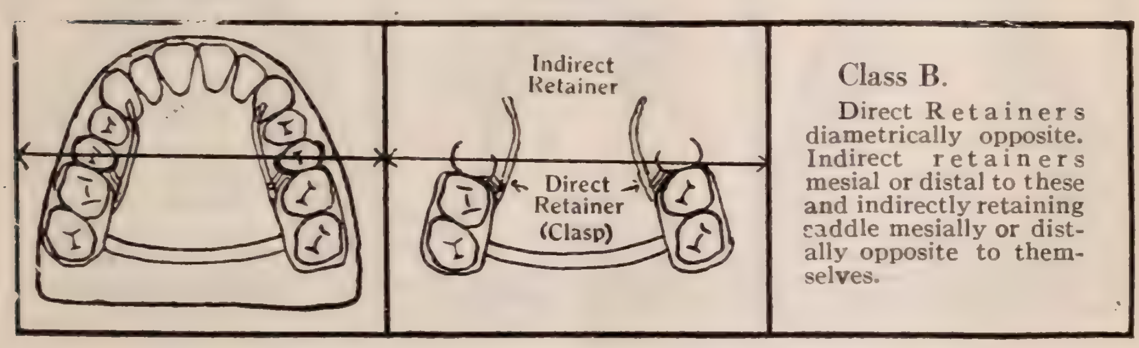
A11—Condition as shown. Preliminary work before impression, inlays as shown, with uncut sprues. Framework as shown, swaged cup bearing Dentsply, Goslee or other crown. Insertion and retention, stud first, balance directly to place. Indirect retainer, through Roach attachment and stud reacts on crown with double occlusal studs.

Class A.—Direct Retainers Diagonally Opposite



A12—Condition as shown. Preliminary work before impression, inlays as shown, with uncut sprues. Framework as shown. Insertion and retention. Stud first, balance directly to place. Saddles and occlusal rests indirectly retain one another through the diagonally-opposed Roach attachment and stud.

Class B.—Direct Retainers Diametrically Opposite

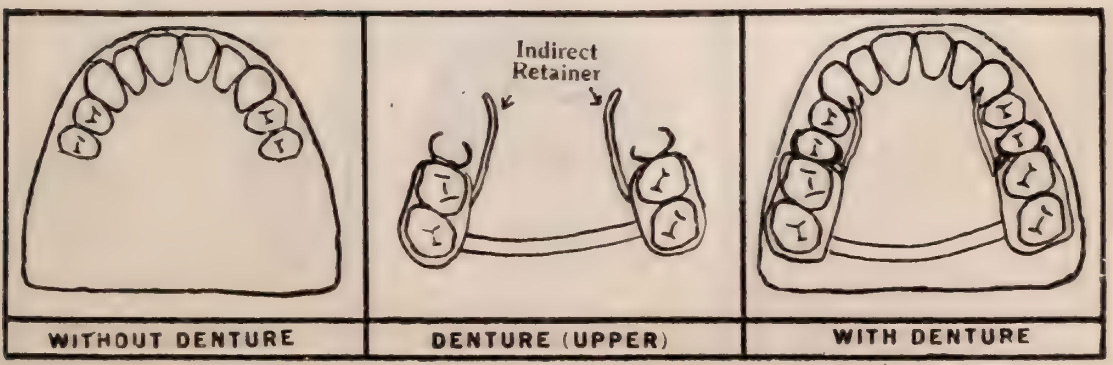


Class B.

Direct Retainers diametrically opposite. Indirect retainers mesial or distal to these and indirectly retaining saddle mesially or distally opposite to themselves.

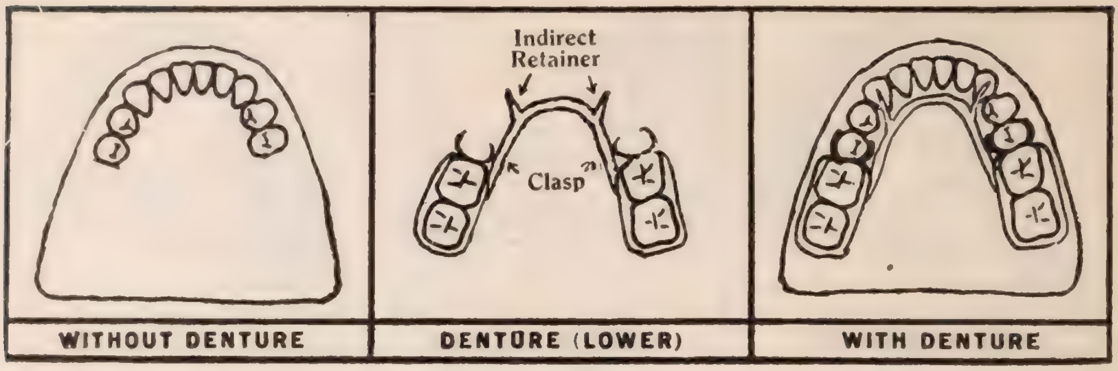
EXAMPLE CLASS B

Fig. 27—Class B.

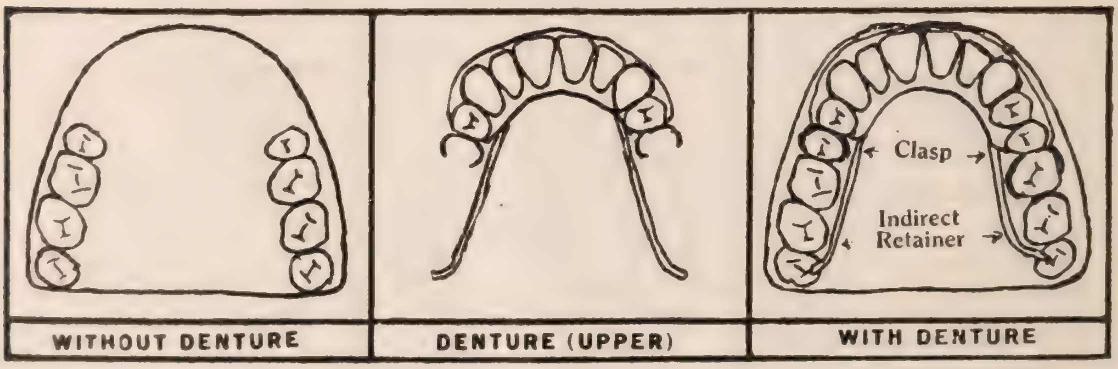


B1—Condition as shown. Preliminary work before impression, individual impressions Melotte's casts and clasps fitted to bicuspids. Framework as shown. Insertion and retention directly to place, indirect retainer reacting on saddles through diametrically-opposed clasps. (See Figs. 23 and 24.)

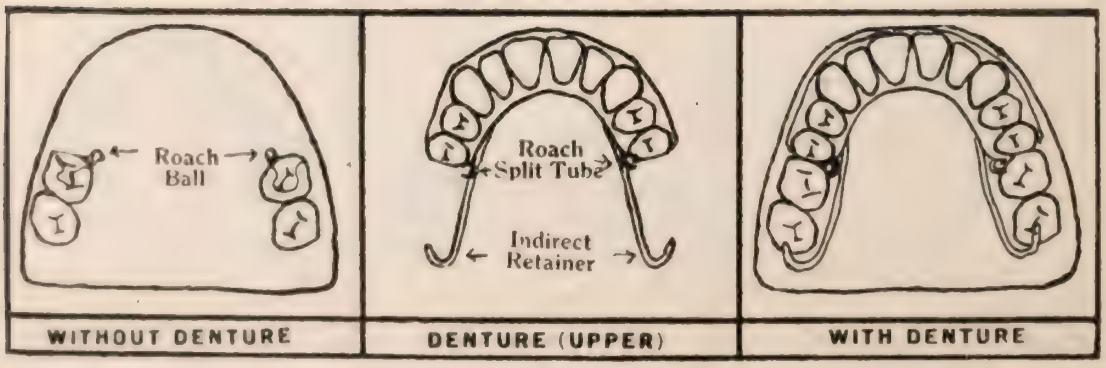
Class B.—Direct Retainers Diametrically Opposite



B2—Condition as shown. Preliminary work before impression, individual impression Melotte's casts and clasps fitted to bicuspids. Framework as shown. Insertion and retention directly to place, indirect retainers reacting on saddles through diametrically-opposed clasps same as B1.

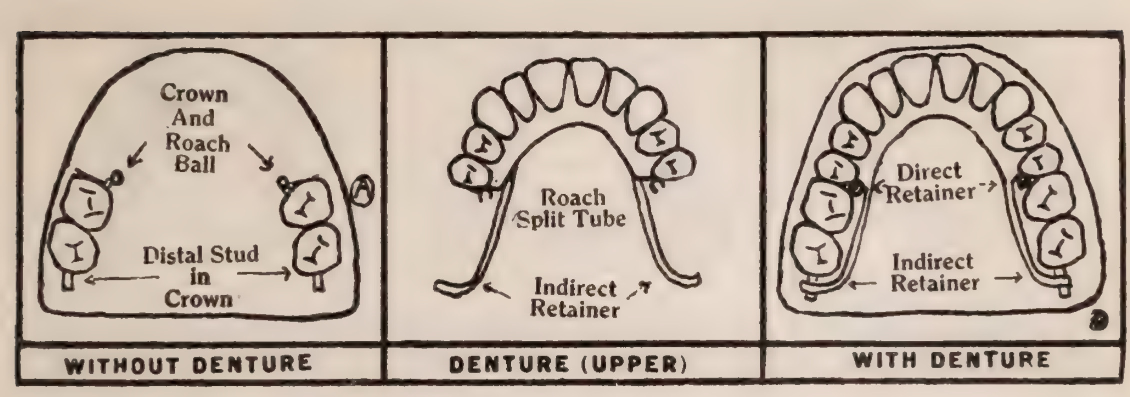


B3—Condition as shown. Preliminary work before impression, individual impressions etc., for clasps. Framework as shown. Insertion and retention directly to place. Indirect retainers react on anterior saddle through diametrically-opposed clasps.

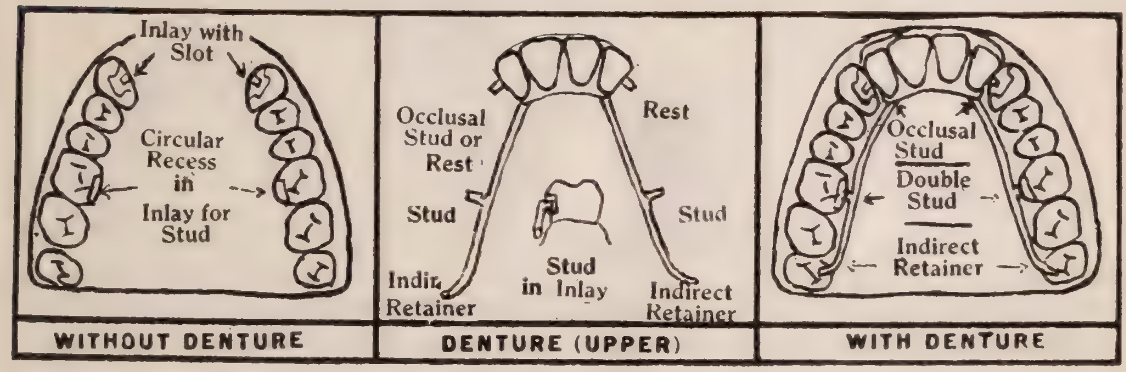


B4—Condition as shown. Preliminary work before impression, two inlays. Framework as shown, Roach split tubes mounted on 14-gauge wires in turn mounted on indirect retainers Insertion and retention directly to place. Indirect retainers react on anterior saddle through diametrically-opposed Roach attachment, similar to B3 and B5.

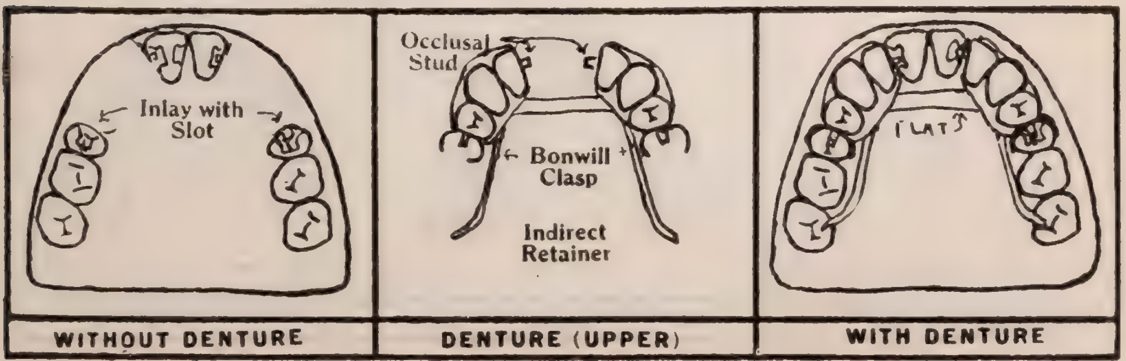
Class B.—Direct Retainers Diametrically Opposite



B5—Condition as shown. Preliminary work before impression, inlays as shown. Framework as shown. Insertion and retention directly to place. Indirect retainers react on anterior saddle through diametrically-opposed direct retainers (Roach attachment), similar to B3 and B4

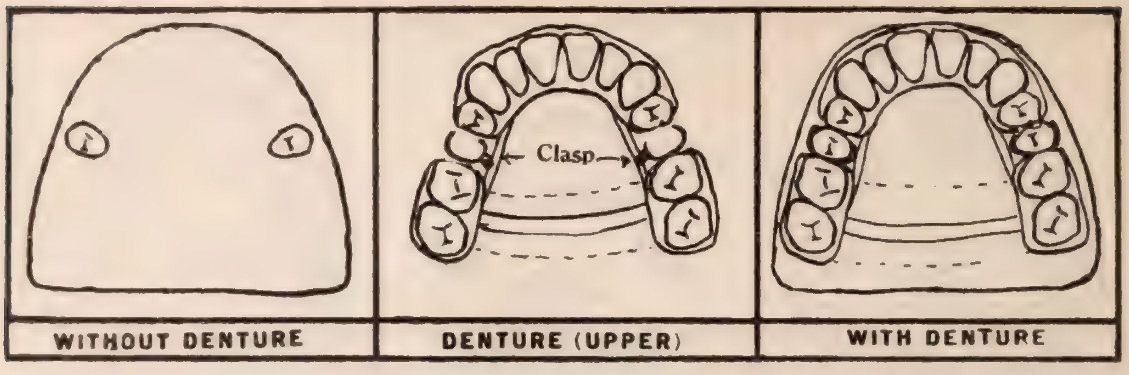


B6—Condition as shown. Preliminary work before impression, inlays as shown. Framework as shown. Extension of 14-gauge plate and gold wire, slightly flattened. Studs mounted on indirect retainers as shown in section in middle sketch. Insertion and retention. One stud inserted, the other sprung into place. Indirect retainer reacts on saddle through these.

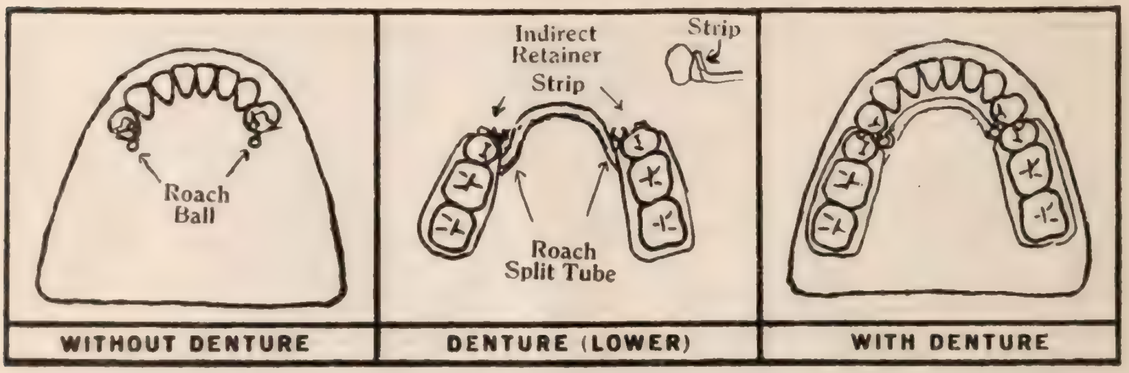


B8—Condition as shown. Preliminary work before impression, inlays as shown. Framework as shown. Note flat piece joining iron saddle. (See Fig. 29F.) Insertion and removal directly to place. Indirect retainers react through Bonwill clasps. Note that remaining teeth share stress.

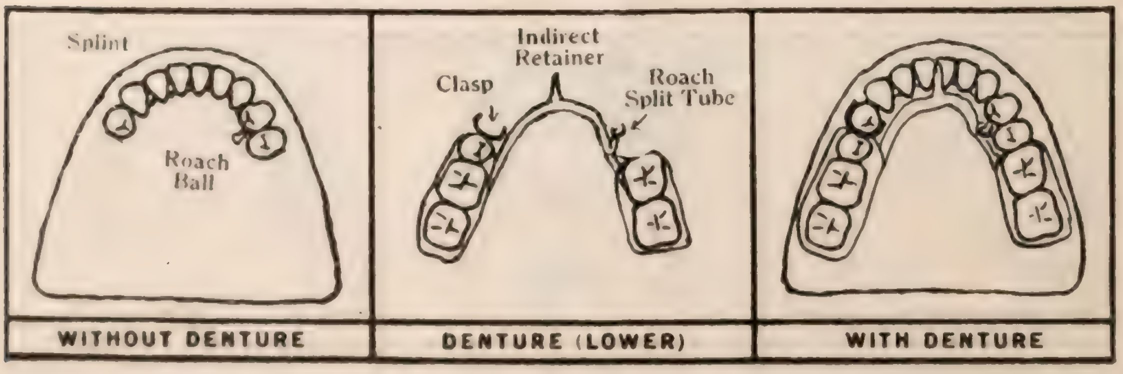
Class B.—Direct Retainers Diametrically Opposite



B9—Condition as shown. Preliminary work before impression, forming clasps from individual Melotte's metal casts. Framework as shown. Distal saddles joined either by bar or plate, depending on area required. Insertion and retention directly to place, anterior and posterior saddles indirectly retaining one another through clasps. Direct retainers diametrically opposite.

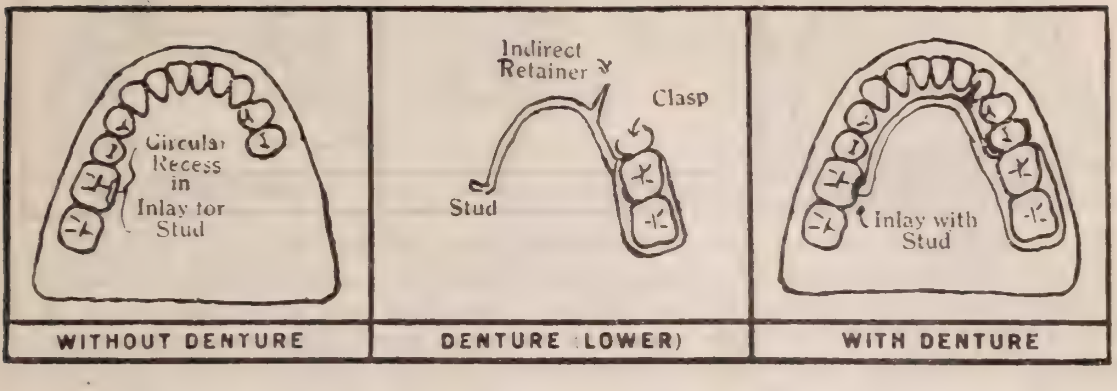


B10—Condition as shown. Preliminary work. Inlays as shown. Framework as shown, with 18-gauge platinum and gold stud touching distal of bicuspid inlay. Insertion and retention. Strips react on saddles through Roach attachments. Not recommended for similar, upper.

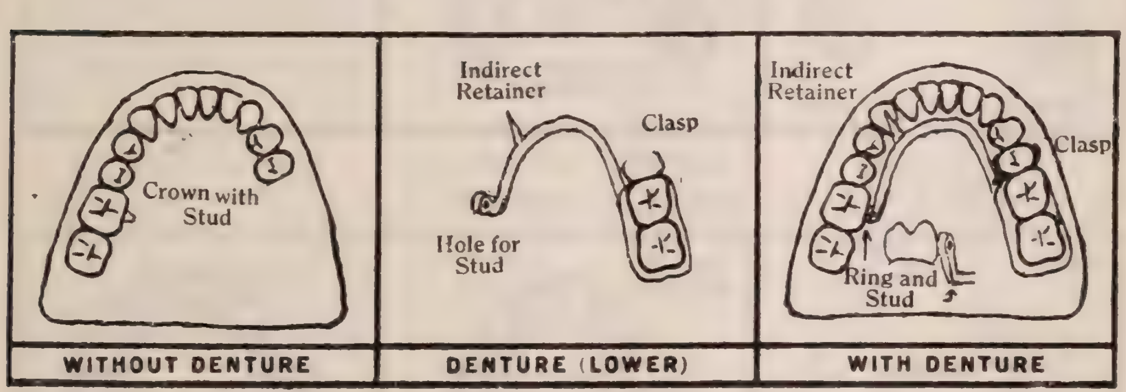


B11—Condition as shown. Sound teeth at end of series not attached to splint. Not desired to cut these. Preliminary work. Splint from left cuspid to right first bicuspid, latter splint end to bear Roach ball. Framework as shown. Roach tube set on 14-gauge wire or lingual bar. Insertion or retention directly to place. Indirect retainer reacts on saddle through diametrically-opposed Roach attachment and clasp.

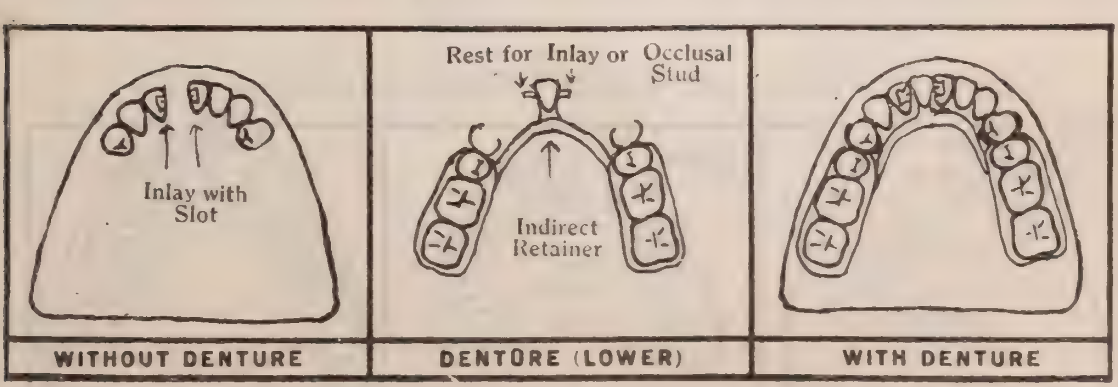
Class B.—Direct Retainers Diametrically Opposite



B12—Condition as shown (see Fig. 19). Bridge in place. Preliminary work before impression. Inlay as shown. Framework as shown. Insertion and retention stud in inlay, then clasp. Indirect retainer reacts on saddle through diametrically-opposed clasp and stud. Direct retainer diametrically opposite.

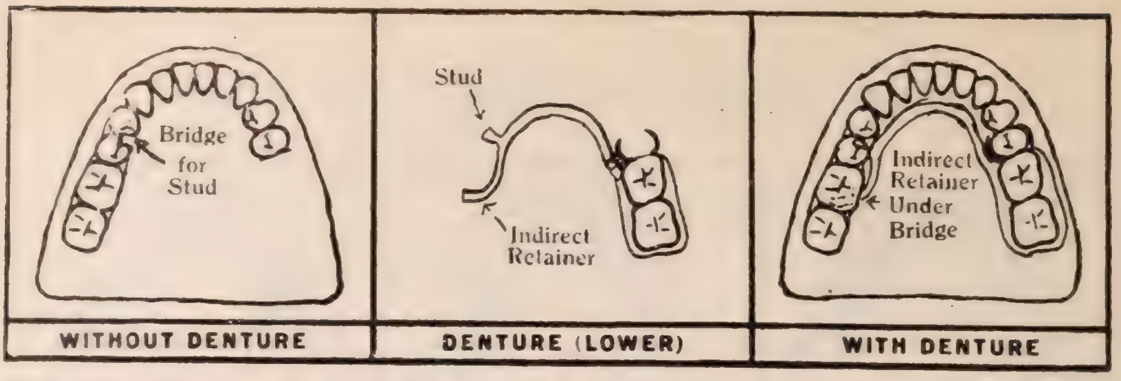


B13—Condition badly broken-down lower left first molar, others as shown. Preliminary work before impression. Crown, for molar. Framework as shown, with ring fitting in stationary stud on molar crown. Insertion and retention, ring over stud first, then clasp. Clasp and ring and stud retain directly (see Fig. 20). Indirect retainer reacts on saddle through these.



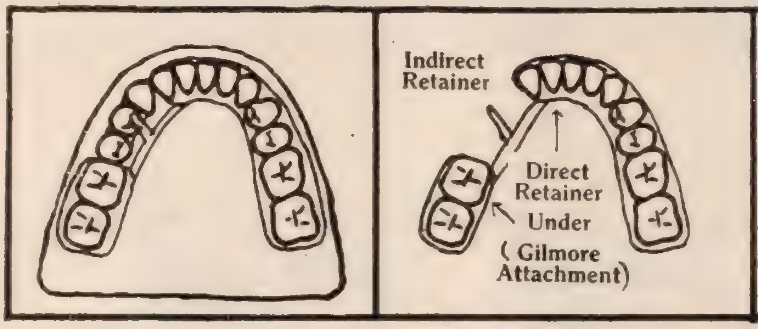
B14—Condition as shown. Preliminary work before impression, inlays as shown and with uncut sprue. Framework as shown; note tooth mounted on indirect retainer. Insertion and retention. Indirect retainer bearing tooth reacts on saddle through diametrically-opposed clasps.

Class B.—Direct Retainers Diametrically Opposite



B15—Condition as shown, with so-called hygienic bridge; removal not desired. Preliminary work before impression, cores under bridge, drill hole and fit 14-gauge wire. Framework as shown. ·See last chapter of this article. Insertion and retention. Stud in hole in bridge first with indirect retainer under, then clasp. Any upward movement of saddle arrested immediately by indirect retainer under bridge, acting through diametrically-opposed stud and clasp.

Class C.—Direct and Indirect Retainers on Same Side

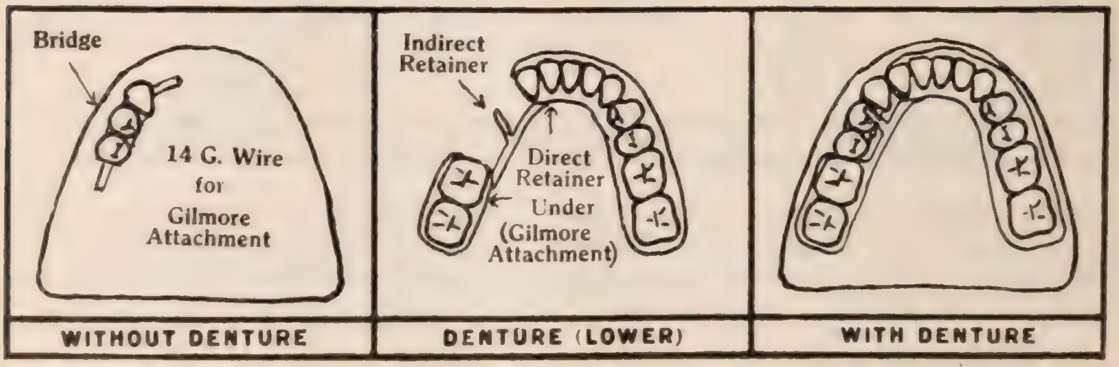


Class C.

Direct and indirect retainers on same side, usually with short series of teeth on one side of mouth only and indirectly retaining the balance of saddle area.

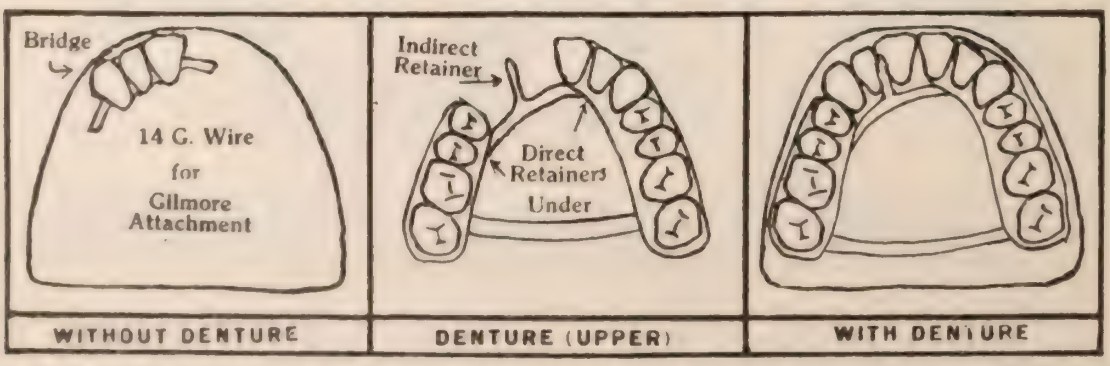
EXAMPLE CASE C1

Fig. 28—Class C—Indirect retainers on same side.



C1—Condition, lower left cuspid and bicuspids standing. Preliminary work before impression, splint these and add Gilmore wires. Framework, saddles joined by bar, carrying two Gimore attachments, and indirect retainer. Insertion and retention held down directly by Gilmore's indirect retainer holding remote parts of saddle.

Class C.—Direct and Indirect Retainers on Same Side



C2—Condition, upper right central, lateral and cuspid standing. Preliminary work, splint these and add Gilmore wires. Framework saddle joined by bars, indirect retainer added to anterior bar, Gilmore attachments under. Insertion and retention. Directly by Gilmore, distally by indirect retainer acting through Gilmore attachment.

REGARDING THE POSITION OF REST

Rule (A)—The greater the distance of the "rest" or indirect retainer from the direct retainer or an imaginary line joining the direct retainers, the less the strain on the retainer or retainers and the tooth or teeth supporting the direct retainers. The resultant force is only the weight of the saddle, plus slight gum resiliency, less friction. (The "rest" and saddle being equidistant from the direct retainer or retainers.) (*Figure* 29, A, B, C, D.)

(B)—Should the "rest" carry the weight of mastication, it should, as a rule, be seated in an inlay. (*Figure* 4.)

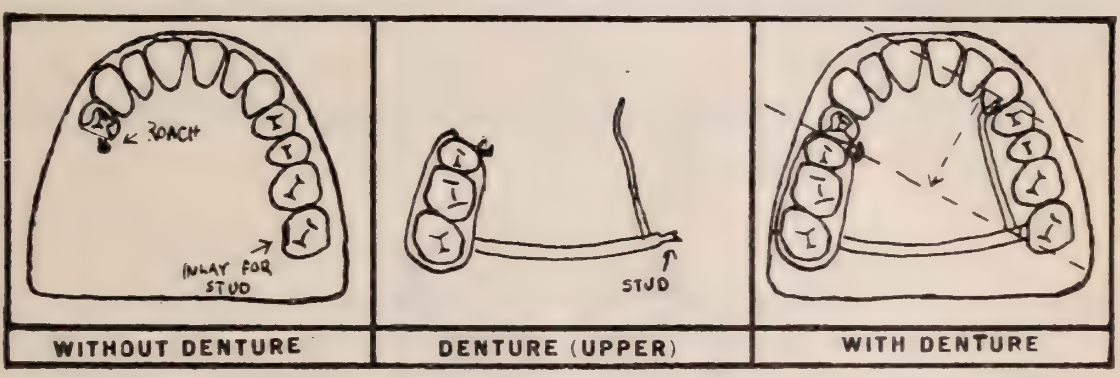


Fig. 29A—Showing position of indirect retainer resulting in least strain on support of indirect retainer left cuspid. Note its separation from line of direct retainers, shown by separation of two dotted parallel lines, rest and saddle being almost equidistant from line of direct retainers.

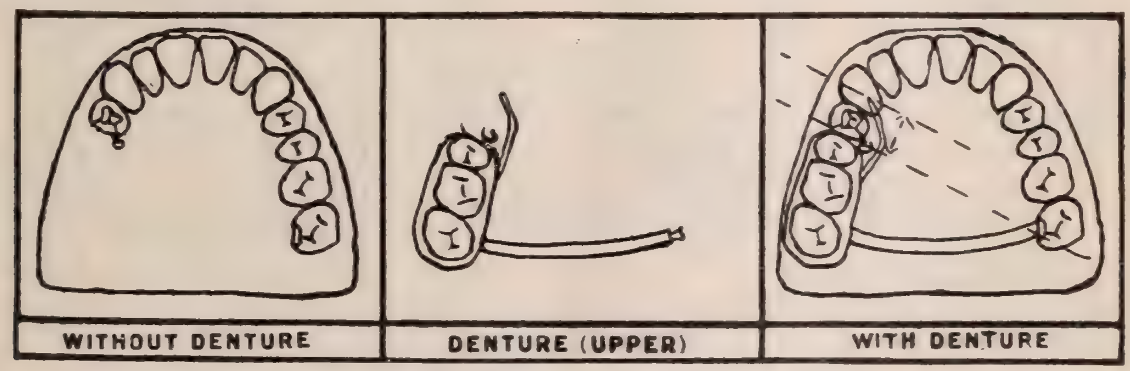


Fig. 29B—Showing another less favorable position of indirect retainers, closer to the line of the direct retainers shown by the separation of dotted parallel lines, causing some leverage on cuspid.

Fig. 29—Indirect retention, variation of construction and position of indirect retainer in the same restoration.

POSITION OF "REST"

(C)—Should always arch over the gingivæ. (*Figure* 29E.)

(D)—A slight advantage, due to the elimination of the elasticity of

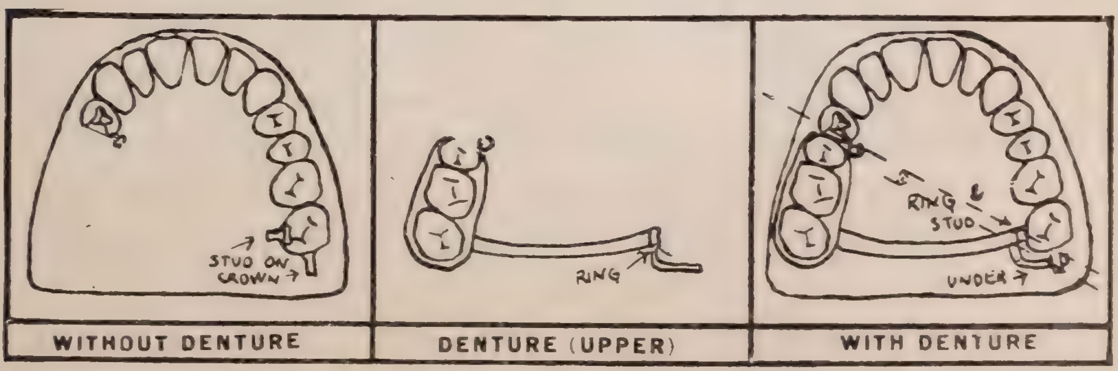
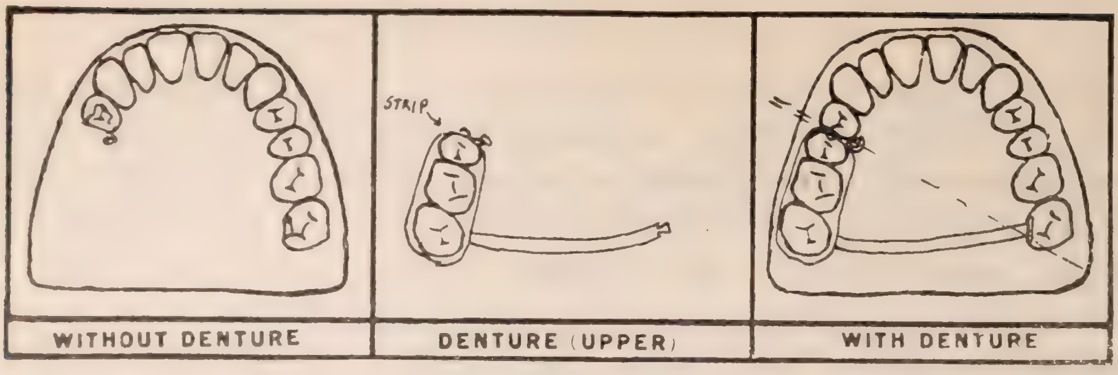


Fig. 29C—Showing another even less favorable form and position of the indirect retainer closer than 29B to line of direct retainers, also shown by separation of dotted lines. More leverage than preceding design, and confined to one tooth only.



Showing another form and position, least favorable, of indirect retainers (strip of metal acting on bicuspid inlay), almost in line with line of direct retainer. Reaction also confined to one tooth only.

the central bar, may be secured by placing the indirect retainer on the same side as the saddle. (*Figure* 29F.)

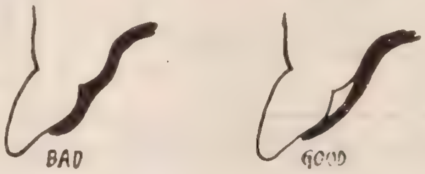


Fig. 29E—Indirect retainer should arch over gingival margin.

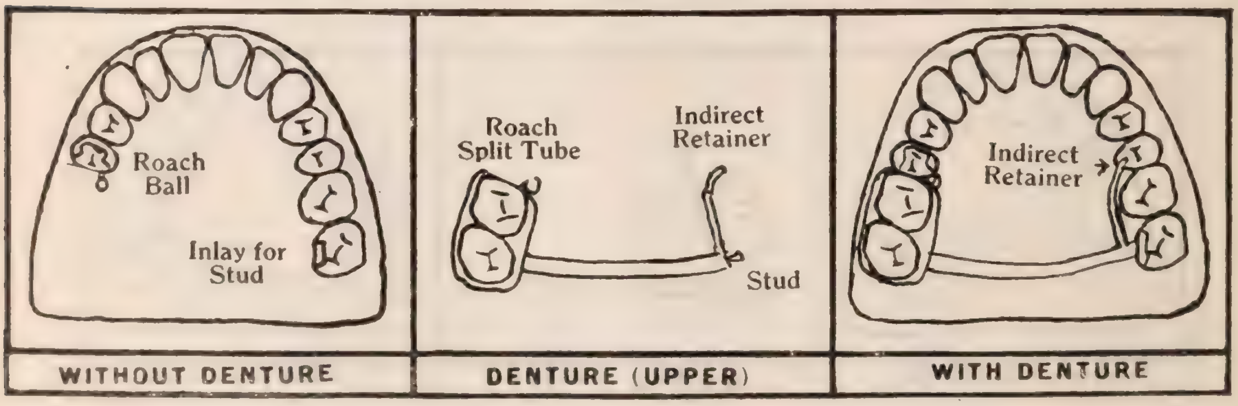


Fig. 29F—(A) Design showing indirect retainer on opposite side of case to the saddle.

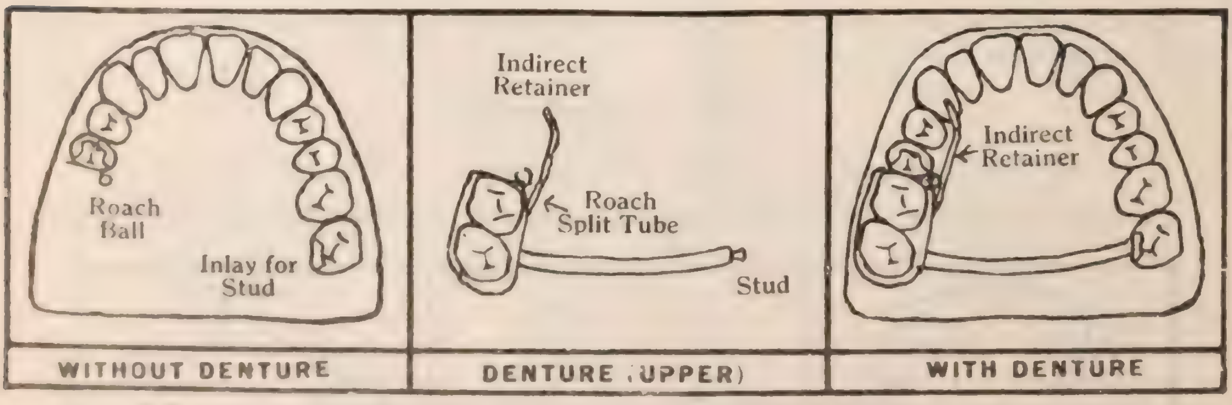


Fig. 29F—(B) Design for same case, showing indirect retainer on same side. Slight advantage here in eliminating elasticity of bar in reaction from indirect retainer. This arrangement (saddle and indirect retainer on same side) is desirable, provided the saddle and natural teeth allow of it.

Fig. 29F—An instance illustrating point of slight loss of efficiency through the spring characteristic of an intermediate part in same case.

TECHNICAL PROCEDURE

As may be gathered from the foregoing, the design of a really sanitary and mechanically efficient piece is a matter for considerable reflection, and in many instances calls for a set of Roentgenograms of the whole mouth, careful root and pulp-canal treatment, extraction of doubtful teeth, and then a pair of study models. In addition to the mechanical consideration suggested in the foregoing, as entering into the design of a partial denture, the element of the possible loss of a tooth or teeth should be kept in mind, and the piece designed accordingly. The design of the denture having been worked out, all crowns, posts and copes (without porcelain), inlays (leave sprue on for drawing from tooth in impression), and various other elements (preferably without dummies) should be completed and placed in the mouth.

TRAYS

From the study model a stock tray of Greene-Kerr, Supplee, or any of the newer patterns, designed to avoid muscle action, may be adapted, or a special tray cast in pure aluminum in each case, preferably with detachable handle, the wax pattern for which may be formed from the study model, or from model of impression compound rapidly obtained by pushing softened impression compound into previous denture and inverting on wet glass slab, cooling and separating.

IMPRESSIONS

The Greene method of impression, with its modifications, is preeminently the scientific and effective method for edentulous cases, and while the exact result in peripherical adaptation and non-interference with muscle action is of paramount importance in securing maximum adhesion and comfort in the above, yet in the many partials even in which retention is provided mechanically, and in which adhesion is not of paramount importance, the principle of muscle trimming is of advantage. For cases involving the posterior teeth, with most or all the natural anteriors standing, the tray may be cut away over the anteriors, the impression made and muscle trimmed, and

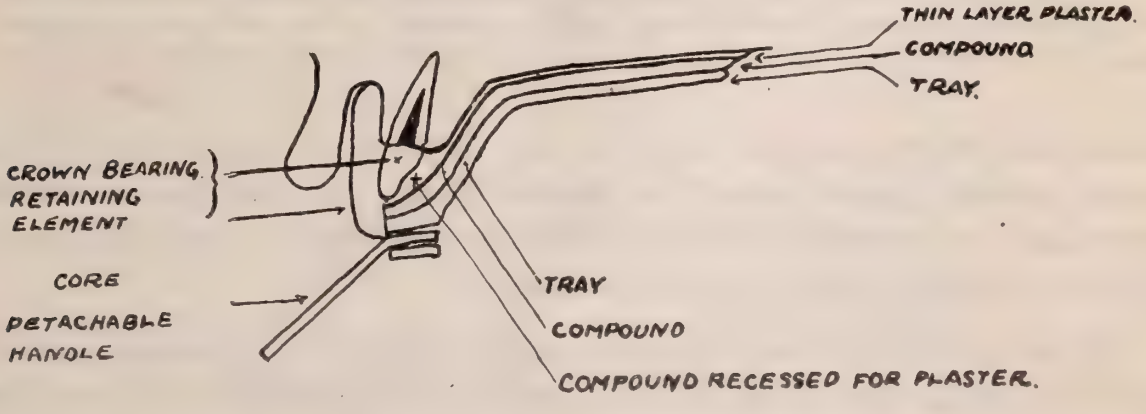


FIG 30.

Fig. 30—Showing section of a muscle-trimmed compound impression with core, and thin film of plaster for partials (see Fig. 15), in which adhesion is desired as an auxiliary retaining force.

after finished, the labial surfaces "cored" in with an additional piece of compound laid across the front of the teeth and pressed in with the lip, with the main impression in place. (*Figure* 30.) In all cases of teeth to be fitted, with abutments of any description present, the compound should be cut away and a thin layer of plaster introduced, having the patient raise the tongue and move lip and cheek to prevent plaster covering already muscle-trimmed periphery. The impression having been made, each crown, post and cope, etc., drawn with it should be given a layer of soft wax or oil which will allow its easy withdrawal from the cast. In most cases, other than such as above, plaster is indicated, either by entire or sectional method.

CAST AND ANTAGONIZING CAST

Weinstein's, Spence's plaster compound or Sorrel stone makes a model approximately four times as dense as plaster, a decided advantage. The materials should be thoroughly spatulated to a consistency of putty, and packed in with wooden sticks into the recesses in the impression made by the teeth. For antagonizing casts in which correctly made full dentures, dentures and natural teeth, and natural teeth alone, nothing is as good, following a method of Dr. R. Gordon McLean, of Toronto, as a plaster impression half way down the necks of the teeth into which may be poured Melotte's metal almost before the plaster is set. In articulating, the interfering points of porcelain blacken from the Melotte's acting in the same manner as carbon paper, a great convenience.

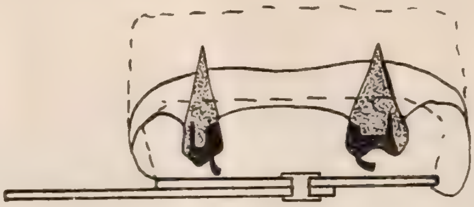


Fig. 31—Method of Dr. H. E. S. Chayes, of New York City, in fitting impression-bearing inlays and crowns, showing varnished and oiled impression, inlays (with uncut sprues), with one shape cement processes built out into space; plaster subsequently added to dotted line.

Should plaster be used for casts, all the precautions against expansion (non-overstirring, non-use of $K_2 SO_4$, no delay in pouring of plaster impression, thick heavy cast, subsequently cut down, etc.), should be observed. Portions of the impression-bearing crowns, posts and copes, inlays or similar, after these are waxed or varnished sufficiently to form a film of intermediate material, may be packed with cement with cone processes reaching into space prior to the filling with plaster. (*Figure* 31.) The cast having been poured, slight heat, sufficient to melt varnish or wax, allow easy removal of inlay, post and cope, etc., and accurate and frequent replacement. In instances of large saddles in which re-swaging is indicated, the use of first-named series of materials is indicated.

BASES

For the saddles of partial dentures, gold is the material which conforms to the requirements in the very best sense, susceptible of a high polish, capable of assembly with solder, thus occupying a minimum of space, and of sufficient strength, properly alloyed, for unobtrusively-formed parts. For small saddles of six teeth and under, casting by the indirect method is expedient, using a thin wax of 28 gauge, applied carefully to cast, covered with French chalk, rubbed in, preventing adhesion, wire rim retainers, space for Gilmore attachment, etc., all worked in in the wax, as well as suitable gates and air escapes (the writer would like to mention the Mathews Wax-Wire Former in this connection—*Figure* 32), and this half-invested. The half-invested and thus stiffened wax may be lifted from the model, the investing completed, and the saddle cast (*Figure* 33) and returned to the model for assembling with the retainers, rests, etc., necessary to complete the base of the partial denture. Aluminum may be used in a similar manner, different in that ordinary baseplate wax may be used, which is of sufficient rigidity to be mounted directly with one operation on the sprue wire; but the attachments must be made of rubber, and the saddles heavier, making a more obtrusive if less expensive part. In the mind of the writer the above process for casting aluminum is so quick, easy and cheap that rubber bases need seldom, if ever, be used; a decided gain in sanitation.

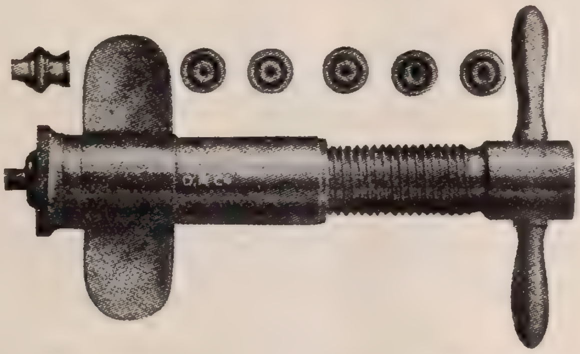


Fig. 32—Mathews' wax-wire former, a most useful laboratory accessory. To be filled with wax, warmed over flame, and on insertion of various nozzles, shown above, wax in wire form of corresponding different sizes and shapes, round, oval, etc., is readily expressed. It is interesting to note that manufacturers are planning to give us wax in various shaped and sized rods for casting.

SIZE, POSITION, ETC., OF BARS, INDIRECT RETAINERS, ETC.

Regarding the size of 18k. stiff oval bar used in joining the saddle elements of partial dentures, etc., from 6x12 to 8x13, Brown & Sharpe gauge, depending on the amount of leverage, large or small stress given by the patient, etc. Concerning the position of the lower bar, the least obtrusive position has been found as low down as the muscles of the raised tongue will permit without chafing; in a cast made from a muscle-trimmed impression at the lowest point behind the alveolar process and 2 mm. back, and inclined the same direction as the lingual surface (*Figure* 34A). This may easily be done by cutting a tinfoil pattern (*Figure* 34B), straightening this out on a flat surface, and bending (*Figure* 34D) the oval bar against the wider cross-section to a position corresponding to the pattern, then completing the bending against the small cross-section, giving the adaptation shown in

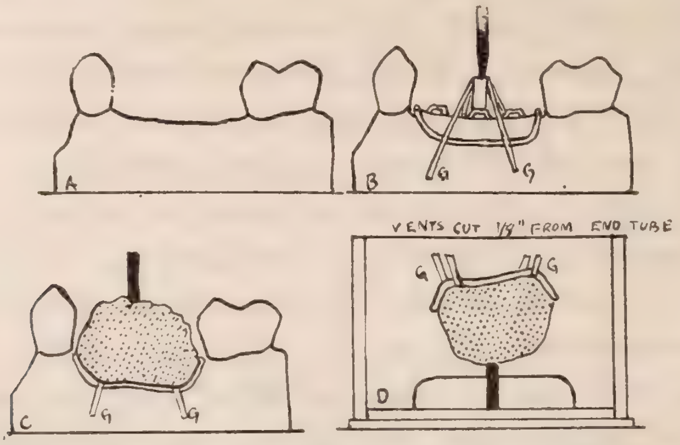


Fig. 33—Steps in investing saddle by indirect retention. (A) Cast, covered with French chalk rubbed in. (B) 28-gauge wax laid down, with wire rim, retainers, gates and vents in position. (C) Ditto, half invested (investment applied with camel hair brush)

Figure 34A, as compared with *Figure* 34E, bent against narrow cross-section only. Sharp right angle bends are accomplished by cutting a 90-degree angle in the bar, bending up, applying flux and small panel of solder, and soldering over Bunsen. Angles less or more than 90 degrees may be found by cutting the angle complementary to 180 degrees in the bar bending over, and soldering in like manner. (*Figures* 34F, G and H.)

CUTTING AND BENDING OVAL OR ROUND BARS

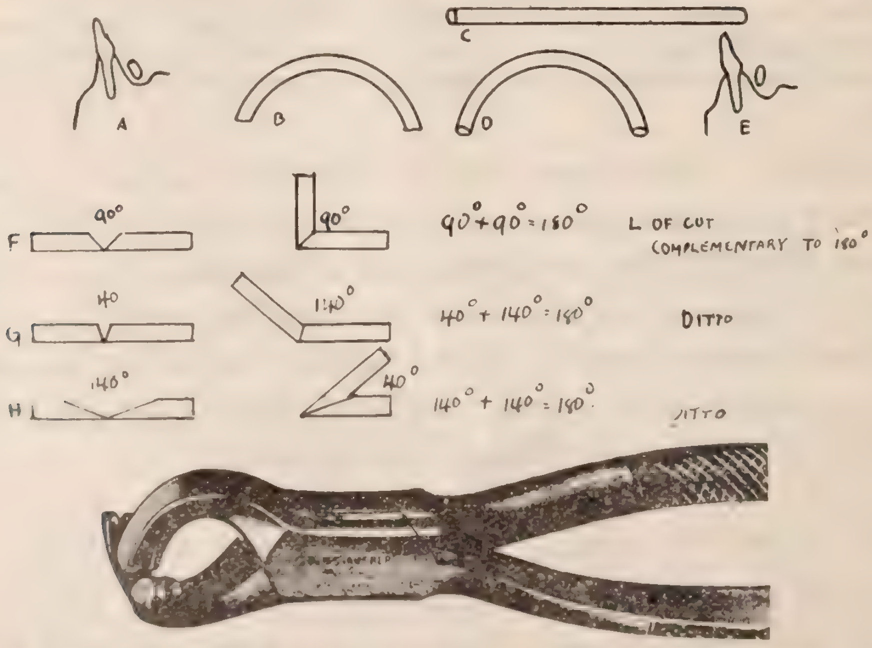
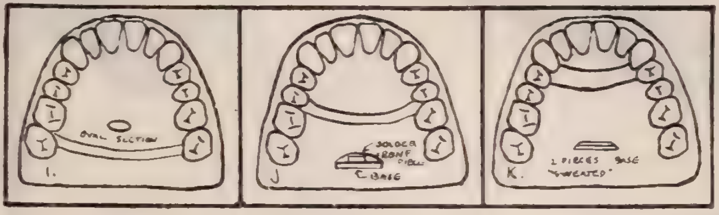


Fig. 34—Bending and cutting oval bar for various curves, angles, etc. (A) Position of lingual bar. (B) Tinfoil pattern, cut and fitted against model, then flattened. (C) Oval bar unbent. (D) Oval bar bent against widest cross-section to tinfoil pattern, using special pliers. When the bending is finished against narrow cross-section, the bar will assume form in Fig. A. (E) If bar is bent in one way only against narrow cross-section, it will assume shape in Fig. E.

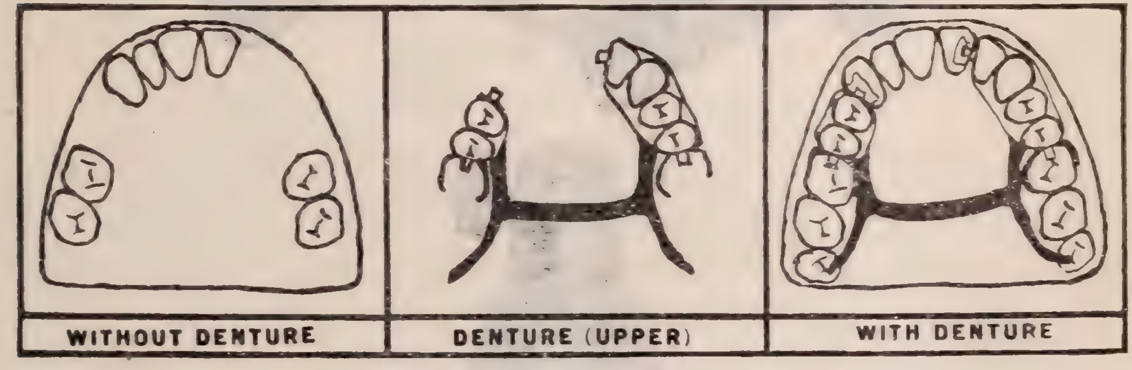
Rule: File or cut angle complementary to angle desired.
F— 90° angle (right), desired cut 90° angle, bend to 90°.
G—140° angle (right), desired cut 40° angle, bend to 140°.
H— 40° angle (right), desired cut 140° angle, bend to 40°.

The size of the upper bar varies as to its requirements similar to the lower, and its position is touching the upper vault, except for a millimeter or less over the hard central area allowing for "settling" and coming about opposite the second molar, is as far back as possible, keeping about one-quarter inch ahead of the soft palate. Should construction call for bar further forward than this, a half-round section or flat section of two thicknesses of "sweated" metal should be used (*Figures* 34, 35 and 29F). For wire for joined indirect retainers, clasp to base, Roach split-tube, etc., a 14-gauge B. & S. rolled slightly, answers well.



A1 A2 A3

Fig. 35—Size and shape of upper bar.
A1, A2, A3—Suggestion for constructing bars in different positions of upper mouth.



B—Restoration with upper bar opposite second molar.

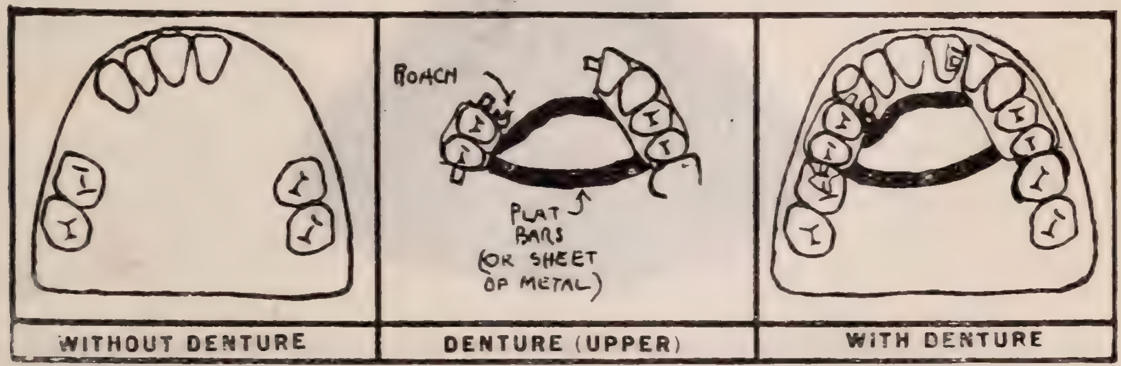


Fig. C—Same restoration, keeping all construction ahead of first molar. Bars A2 or A3 might be used, or one sheet of 26-gauge gold.

Care must be taken in bending the indirect retainers to keep them away from the gingival. (*Figure* 29E.)

Note—Often bars, indirect retainers, etc., may be unobtrusively placed in between rugae.

ASSEMBLING OF METAL PARTS

The various parts as retainers, rests, saddles, bases, etc., having been united (using ground asbestos wet—Neutralite), or the Elliott soldering pliers (*Figure* 36) for parts not requiring absolutely exact relationship, as the wire on the Roach split-tube, the 14-gauge wire on a clasp, etc., assembling these partly assembled pieces with wax (always heat pieces to be waxed together and flow wax thereupon before waxing together, thus preventing separation),

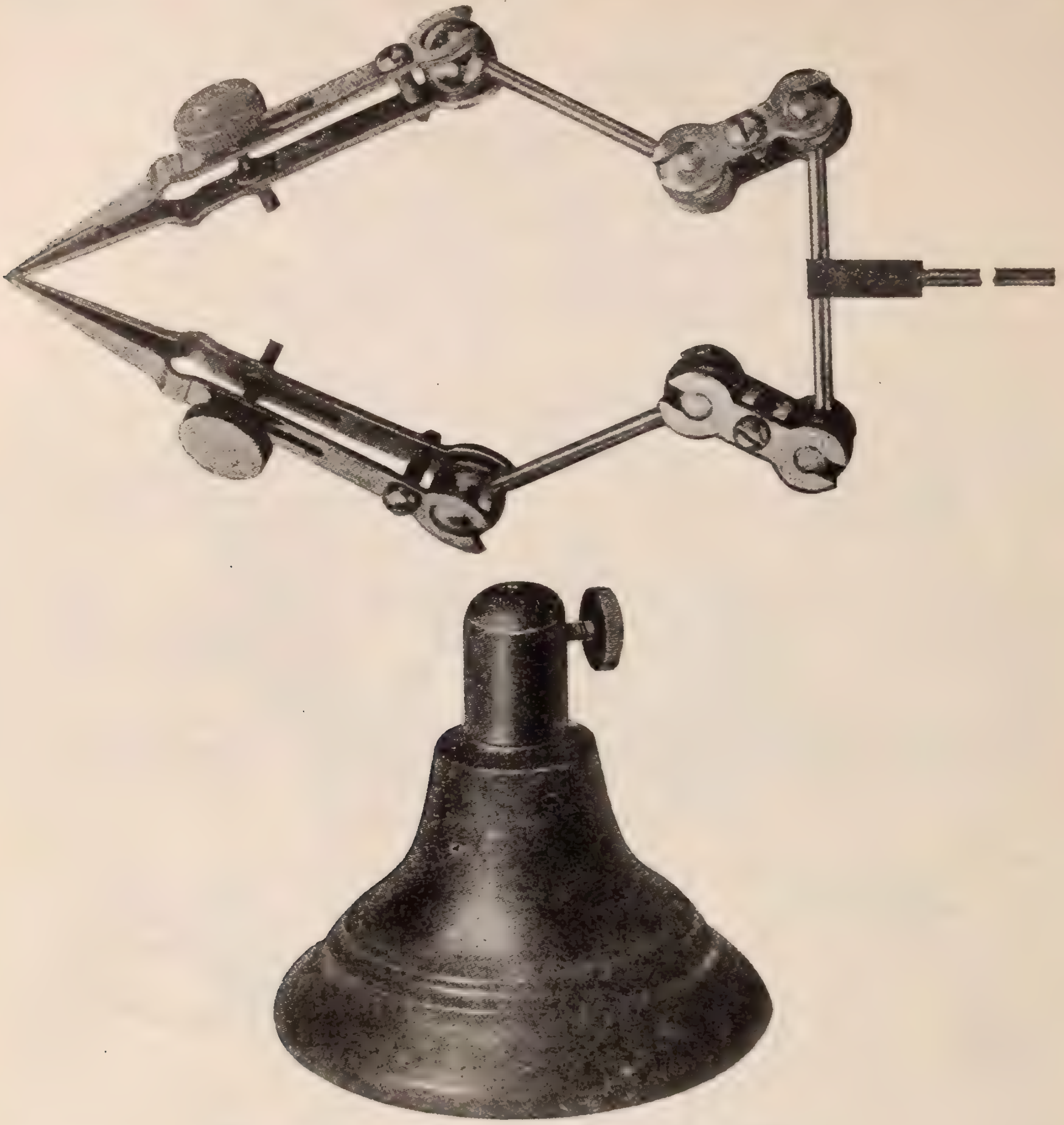


Fig. 36—Elliott soldering pliers and stand, a useful adjunct for rapid soldering without investing small parts, as clasp on 14-gauge wire, Roach attachment to inlay, split tube to 14-gauge wire, etc., not requiring absolute accuracy.

and investing with a standard material. This having been satisfactorily completed, and its accuracy checked frequently and finally by trials in the mouth, held together by both wax and subsequently solder, wax trial plates may be built down, and the process of "taking the bite" begun.

TAKING THE BITE

Unless there are a sufficient number of upper and lower natural opposing teeth with defined occlusion in contact, making possible the accurate placing of the casts in the position of the rest bite, trial plates with built down wax rims are necessary. In most cases, details associated with full cases, as amount of separation of the ridges, median line, facial contour, etc., are already supplied by the teeth, and the first step is usually the securing of the rest bite, also simplified by the presence of teeth as land-marks. The next step, the placing of the models in the anatomical articulator, is accomplished very easily by either the Snow face bow, or the Gysi registering instruments (the latter which serve to trace the condyle path, lateral movement, etc., and rotation point tracing). In the Snow face-bow bite stem No. D (*Figure* 37), the lower may be fastened to the articulator first, the face bow and stem removed, and the upper fastened to the lower by the indents in the upper trial plate, from the natural teeth. With Prof. Gysi's instrument (horseshoe plate), the process is the same. The inclination of the condyle path, lateral movement, and position of the rotation points may be obtained from patient and incorporated in the articulator, so far as the writer's knowledge goes, only by the registering apparatus and adaptable articulator of Prof. Gysi's.

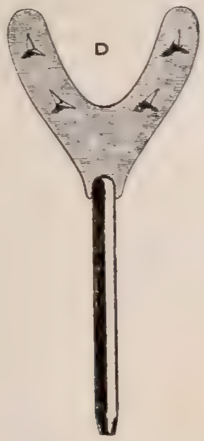


Fig. 37—Stem No. D. Snow face bow

ANATOMICAL ARTICULATION

Nowhere is the observance of established principles relating to the movements of the jaw and harmonious arrangement and formation of the teeth of more importance than in the construction of partial denture—

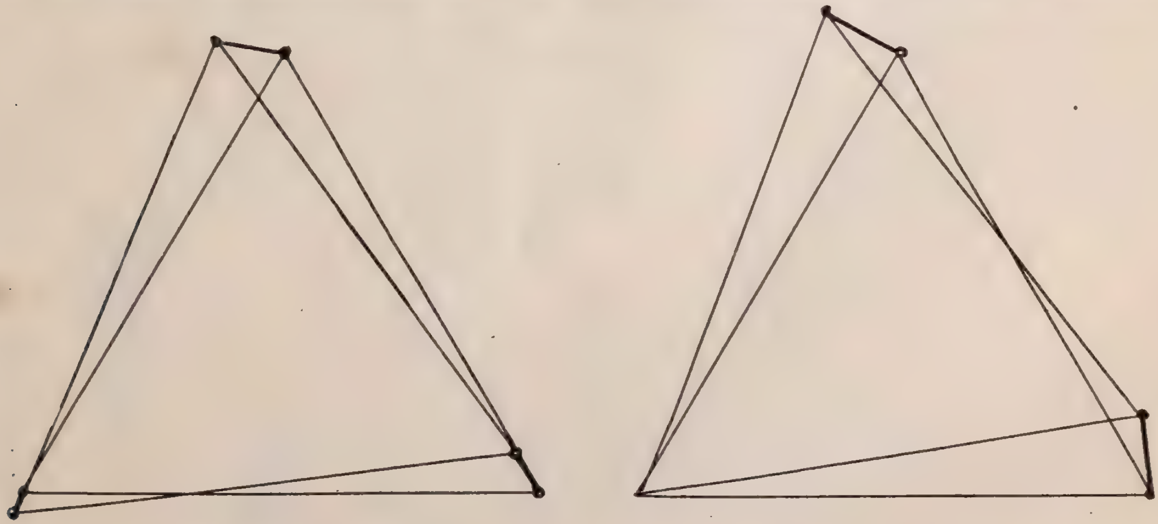


Fig. 38A—Incorrect. Fig. 38B—Correct.

Schematic representation of the correct and incorrect theories regarding the movement of the mandible at the condyle during lateral movement referred to in text. It has been supposed that when the jaw was swinging to the masticating side that it was simply swinging in a rotary movement with the opposite condyles as center. Prof. Gysi has shown this to be incorrect, and that in the lateral mastication movement the whole mandible moves inward laterally as well as forward, while on the other side the condyle, instead of merely rotating (Fig. 38A), moves slightly outward (Fig. 38B). See also Figs. 39A and B.

removable pieces. Interferences of porcelain in side movements of the jaw in mastication has resulted in the failure of many an otherwise perfect piece of work, as has non-interference of porcelain or gold accounted for

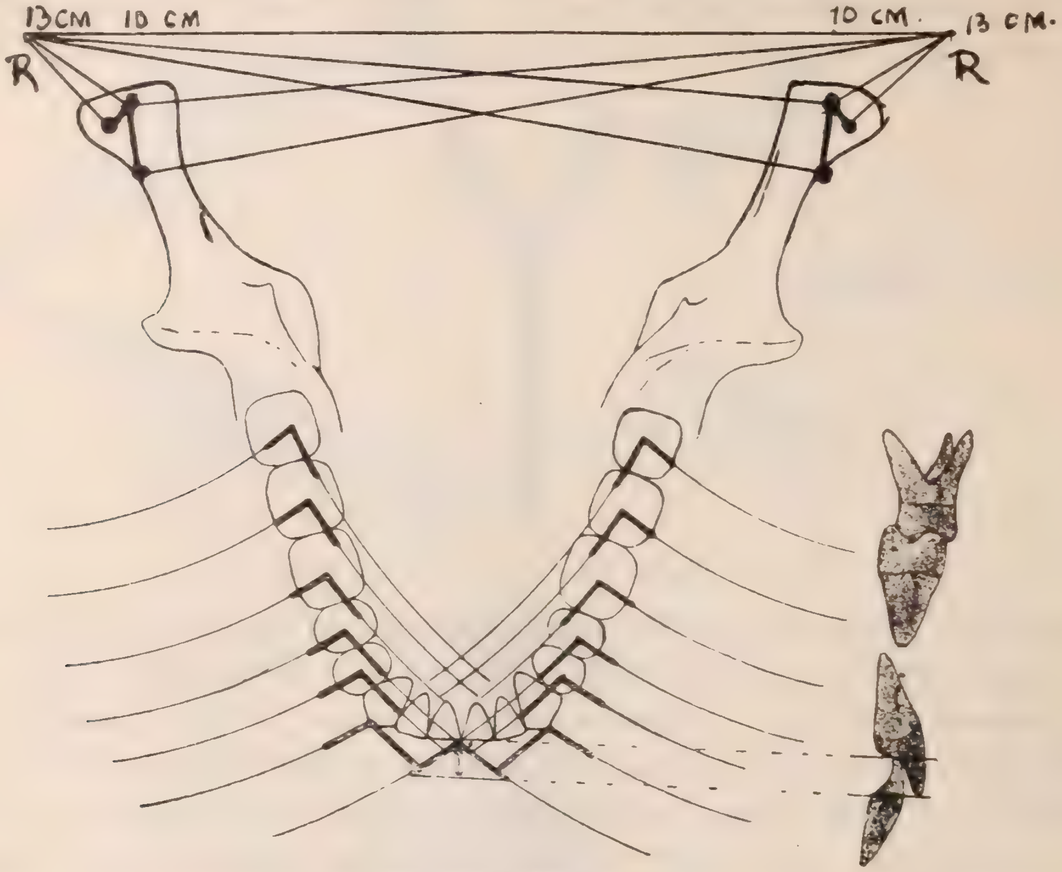


Fig. 39A—After Gysi.

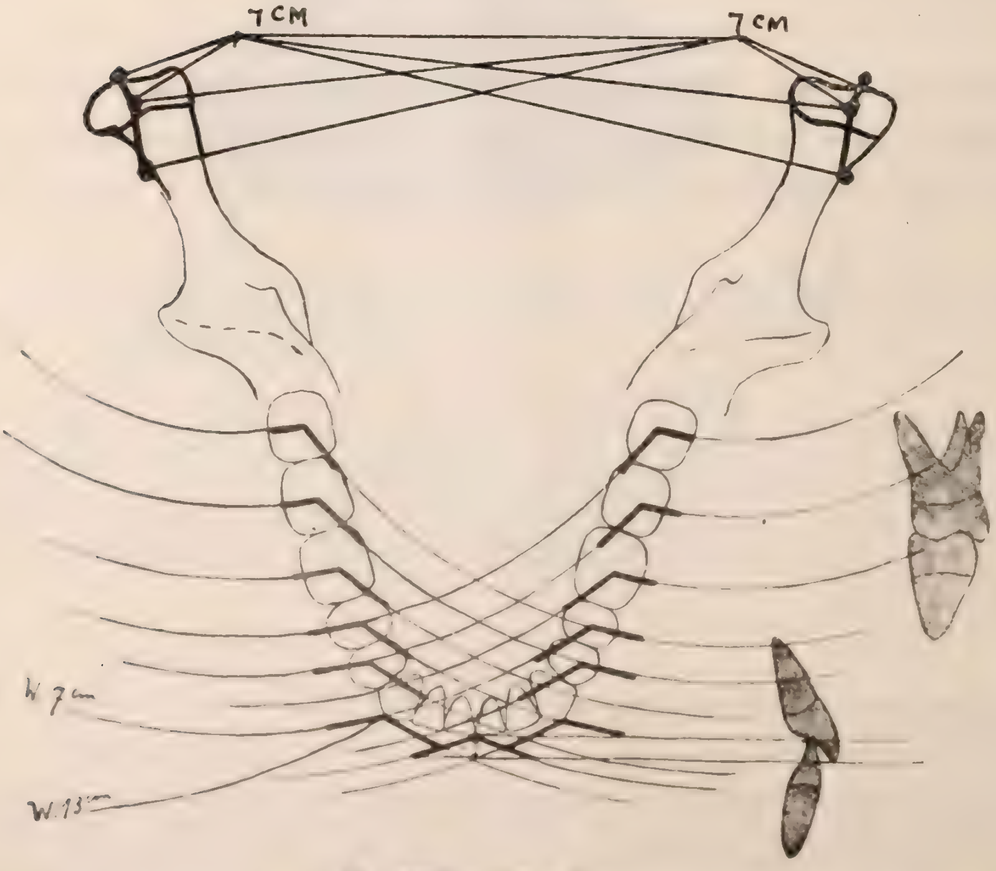


Fig. 39B—After Gysi.

Fig. 38A shows rotation point 13cm. apart from the greatest distance, and to the distal. In a side movement, say toward the left of the page, the jaw is swung not from the condyle, but at the left hand, R, the rotation point. The condyle nearest it takes the short path, the ends of which are joined to the two short radii running from R, and the condyle farthest away from R follows the longer paths, the ends of which are joined by the two longer radii from R. The heavy lines, therefore, denote the travel of the condyle in the glenoid fossae. Note also the oblique lines running from the center of the teeth themselves which represent the travel of the upper lingual cusps in side movements. In a side movement towards the left of the page, the lingual cusps on the upper on the right side of the page would describe areas obliquely forward on the occlusal surfaces of the teeth on the right side of the sketch, while on the masticating or side nearest the rotation point the cusps of the upper travel buccally through the intercuspal spaces. Fig. 38B is similar to Fig. 38A, except rotation points are 7cm. apart instead of 13cm. If the mandible swings, say to the left of the page, the jaw swings from the left hand R, or rotation point, and on the left side the condyle describes the short arc of the circle, with R as center, joined at each end by the two short radii, while on the other side the condyle travels forward, describing the arc touched at either end by the longer radii from the left hand R. Note in Fig. 38B the difference of the cusp travel in the two lines described by the lower cuspid, one with rotation points at 7cm. and the other at 13cm. Note also that with widely separated rotation points and forward travel of the cusps of lesser obliquity as in Fig. 38A, admits of greater cusp height and overbite, as shown by small sketch at side of the page, while in Fig. 38B, with rotation points close together, the forward of the upper lingual cusps in the masticatory groove of the lowers is more strongly oblique, necessitating lesser cusp height and overbite as shown at the side of the diagram.

at any rate the comfort of other fearfully shapeless pieces of restoration. (*Figures* 38 and 39.) The correct registry and reproducton on the articulator of the condyle path, and more important than that, of the lateral movement and rotation centers as well as correct placing of casts in articulator, is of utmost importance, and furthermore, even with the Gysi system, is simple, adaptable to all cases, and within the reach of any average practitioner, and eliminates possibility of failure from this source.

The condyle path may be secured by the protrusive bite in event of lack of the Gysi registering frame.

CHOICE AND ARRANGEMENT OF TEETH

The close proximity to the artificial teeth of partial dentures as well as crowns and bridgework of the natural and living teeth, make the problem of color and form the most difficult of all. While the teeth offered to the profession today, resembling as they do the crystallized knowledge of some of the brightest minds in the profession, such as Drs. Williams, Gysi, and others, yet in partial denture construction, alterations in form and color are frequently necessary. The imitation of receded gums, with considerable length of root showing (*Figure* 40), different stages of wear, overlapping, erosion, cracks in enamel, characteristic forms varying from ordinary, chalky spots and creases in enamel to brown stains from tobacco, etc., occurring in corresponding teeth on the opposite of the arch, should be reproduced with greatest fidelity. A careful selection, with the articulator

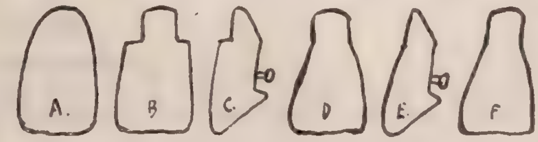


Fig. 40—Grinding teeth to imitate recessed gum. (A) Tooth, correct width, but too long. (B) First cut, outlining mesial and lingual side of root. (C) Second cut, outlining mesial and lingual side of root. (D) Third cut, outlining mesial and distal side of tooth. (E) Fourth cut, outlining labial of tooth. (F) Cuts smoothed and rounded with disc and "gloss stick."

and models carrying the assembled frame work in the hand, with full details concerning the shade at hand, are necessary, following that in some cases the use of the stone, discs, porcelain polishing materials, and porcelain stains. Dr. Wilson's text, "Dental Prosthetics," also "*Oral Health*," 1915, p. 501, gives details concerning this most important branch.

ARTICULATING

The front six should be adjusted satisfactorily and tried in the patient's mouth before any of back eight are adjusted. Incidentally, at this stage might be mentioned one of the great advantages of the assembled and soldered gold base, as at the time the assembling of the various parts forming the base complete, the retainers are adjusted and the piece fits positively into place as when completed, and the teeth firmly waxed thereupon, an exact counterpart of the future denture is available for inspection and study; lacking in vulcanite and aluminum pieces. Gold dummies and occlusal surfaces of crowns may be formed in wax either in the mouth (*Figure* 41), or against one another, or against porcelain or plaster reproductions of natural teeth as the case may be, or porcelain teeth against Melotte's or Spence's compound lower, the former showing the high spots black. Slide and protrusive movements should be given as each tooth is added, and interference corrected with the stone if necessary. In case of too limited space for porcelain teeth,

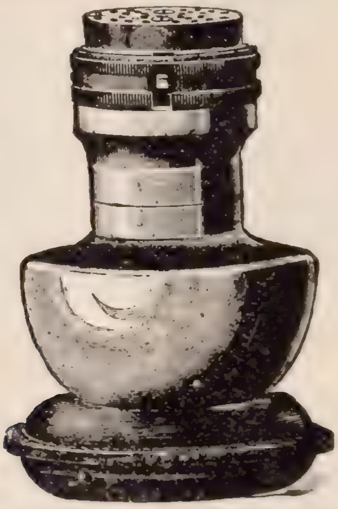


Fig. 41—An engraver's block. (Price $7.00 and upwards, in jewelers' supply houses.) A universally movable revolving vise, in which engravers clamp various articles to be engraved. A bridge, crown or inlay, in which it is desired to deepen the sulci with a diamond-shaped engraving tool, placed in the swager ring with Kerr's compound, and clamped in above, may be worked upon with greatest facility with the engraving tool.

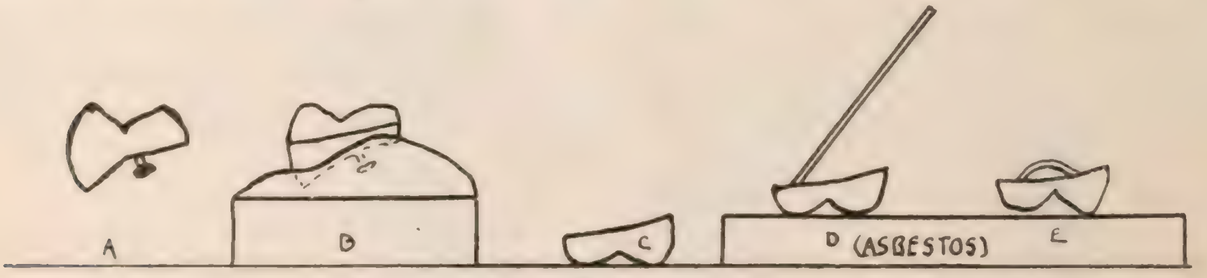


Fig. 41A—Special tooth for short bite. (B) Ditto, mounted in swager ring with pure gold (34 gauge) swaged over it. (C) Pure gold occlusal surface removed from tooth. (D) On asbestos block, filled with solder and 18-gauge wire inserted. (E) Wire bent down forming loop.

the tooth of the series desired may be mounted in the swager ring with Kerr's compound, a piece of pure gold of 34 gauge adapted directly to the porcelain tooth, filled with a 20k. solder on asbestos, and with the addition of a loop, a perfectly accurate replica of the occlusal surface of the tooth (save for the thickness of the gold .006″) (*Figure* 41A), may be rapidly secured. In event of insufficient space even for this, the writer has secured good results by securing side movements on wax, added directly to gold, saddle, carving, and casting directly to saddle.

CONVERTING FROM WAX TO VULCANITE, CORRECTING, ETC.

All the known precautions should be observed, namely, the non-use of hasteners in plaster, use of Spence's plaster compound, Sorrel stone or Greene curved metal reinforcement for teeth similar for casts, non-overstirring of plaster, use of springs, careful packing, gate cutting, etc., with proper scoring, as many as possible retainers, and a sharp finishing edged on metal base (*Figure* 42). No shrinkage should be encountered.

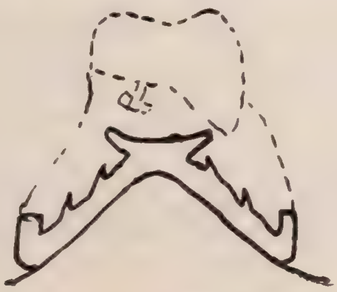


Fig. 42—Cross-section of metal cast saddle, showing abrupt finishing edge, spurs, etc. Tooth and vulcanite attachment shown in dotted lines.

The cases may thus be returned to the articulator, having been polished, and any necessary corrections made with a mixture of medium carborundum and glycerine, or carbon paper, or, if only one arch is restored, by the mere rubbing of the Melotte's antagonizing model and a slight grinding of marked points.

Upon returning to mouth the only possible correction that should be necessary should be the final slight adjustment with carbon paper, giving the natural teeth a larger percentage of stress, and the possible final adjustment of the retainers, indirect retainers, etc.

Illustrative of the foregoing, the writer believes an example of a definite restoration, giving each step, will be of assistance.

Condition, upper: Four badly broken-down molars, first and second, Upper first left abscess, long standing, level with gum, except distal wall. which standing in good condition. Anterior ten absent and absorption complete.

Restoration, upper: Gold shoulder crowns, above gingival margin, 14-gauge wire carried distal from each of second molar crowns 2mm. above gum. Roach attachment for first molar, distal horizontal wire for indirect retention. Denture-cast gold saddles, vulcanite attachment with Roach

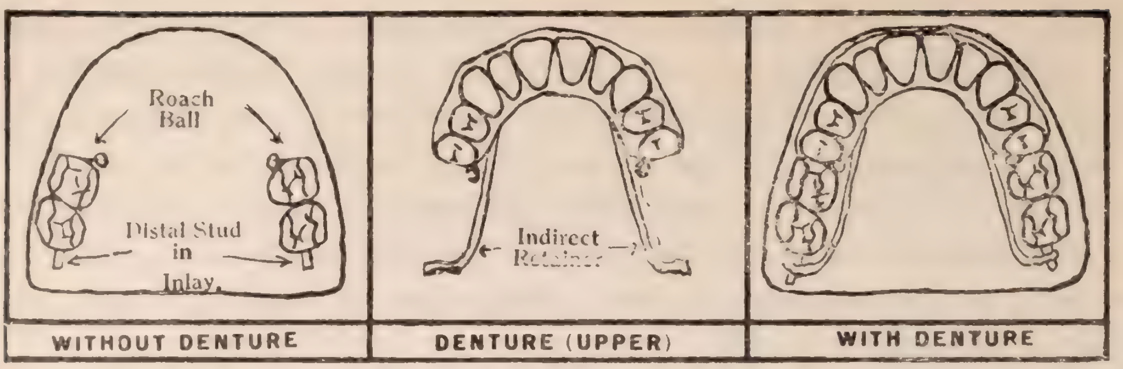


Fig. 43.

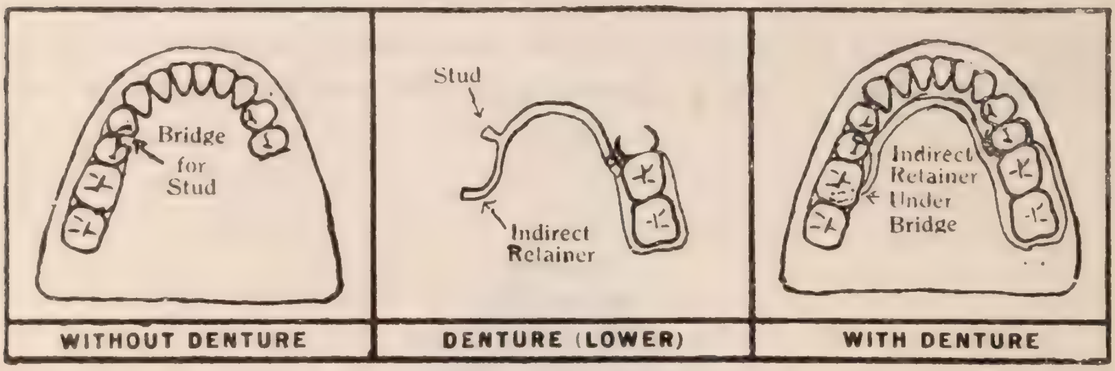


Fig. 44.

attachments and distal rests. (*Figure* 43.) Lower condition so-called hygienic bridge in healthy condition on left from lower first bicuspid to lower second molar, anterior six and lower right first and second bicuspids, all in good condition, rest absent.

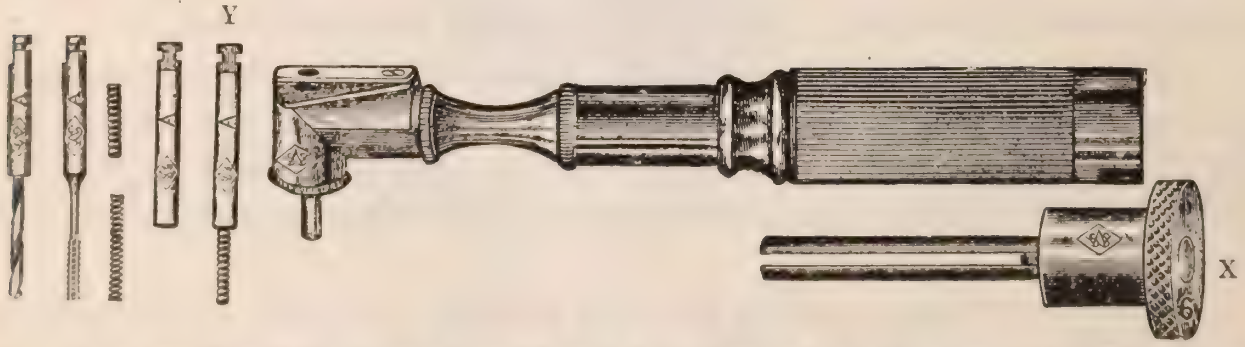


Fig. 45—The S. S. White Howe Screw Post System and Actuator. (A) Howe screw post drill for right-angle handpiece. (B) Howe screw post top for right-angle handpiece. (C) Lengths of screw post. (D, E) Instrument for placing Howe screw post. (F, G) Right-angle handpiece and actuator. The actuator fits in the engine end of handpiece.

Lower Restoration: Bar lower, with stud engaged in hole made in bridge (in mouth), indirect retainer below first molar or bridge, with clasp and bar joined to gold saddle carrying teeth on right. (*Figure* 44.)

Steps: Upper (begin first because of treatment). 1. Upper left first molar (first because of abscess), caries removed, canals thoroughly opened and washed, Howe screw post fitted diagonally, using Hood's angular handpiece, with Howe screw post drill in engine, and S. S. White actuator (*Figure* 45) working tap, and subsequently screw driver with Howe post into position in cement, gutta-percha cones in canals, silver nitrate to dried dentin.

Onderdonk or Ivory matrix, pack amalgam; remove gutta-percha cones before amalgam sets, seal in medicament. (See *Figure* 10.)

2. Treat, fill and restore upper molars, prepare for crowns, treat with silver nitrate, make small compound impression of each pair, fill with Spence's plaster compound.

3. Fit bands to each of above (four upper molars), try in mouth.

4. Heat left pair of crowns, dip occlusal ends in two-ply softened sheet wax, trim and slip in mouth, asking patient to close gently (to separation desired) and make side movements. Remove, trim, carve cusps and casts. Over right pair solder floors of pure gold (no opposing teeth here yet).

5. Add yellow wax to inside of each of the bands of the crowns, press home, fill with Spence's plaster compound, re-burnish. (See *Figure* 9.)

6. Returning to model, fit or make special tray (if patient has an old type denture push compound in and fit stock tray or make pattern for cast aluminum tray on this. Take impression, Byrtis or Nielsin plaster, having patient make whistle and smile movements, massage lips, add wax inside of crowns for easy removal, make Spence's plaster compound cast, with crowns mounted thereon.

Lower: 1. Drill hole in bridge, size of 14-gauge wire, fit plaster or compound cores below bridge. (*Figure* 46.) Fit wire to hole.

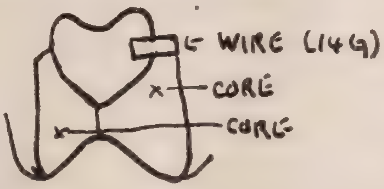


Fig. 46—Showing position of cores, wire, etc., for impression of lower.

2. Make separate plaster impression of lower right second bicuspid, pour in Melotte's metal, form clasp from tinfoil pattern, using contour and other pliers and small steel hammer for close adaptation, add clasp to bicuspid and short piece of 14-gauge wire in hole, make special tray from plaster model from rough compound impression, or fit stock tray to mouth, to tips of incisors only.

3. Heat compound and apply to tray, take impression in compound.

4. Remove impression and trim margin thin, cut out around pin and clasp, build up biting block, trim margins thin.

5. Soften disto-lingual half, return to mouth, have patient close and swallow; repeat until no further action of muscle or compound, gently pressing material toward ridge with wiping finger movement.

6. Soften mesio-lingual half, have patient lick lips, following with slight finger pressure against material toward ridge. Repeat till no further action.

7. Soften buccal rim, have patient close firmly and cheek massage. Define masseter muscle; continue till no further action.

8. Replace cores, clasp and 14-gauge pin, flow thin plaster on impression, return to mouth; have patient hold by closing. Work ball of softened compound across labial aspect, front sixes either now or with hardened plaster and compound impression subsequently in place. Remove and place clasp pins, cores, etc., in impression. Pinch thin copper around pin, pour in plaster, giving cast with clasp, and copper-lined hole. Add Roach and distal rest wires to upper with wax; remove, invest and solder.

9. Cast gold saddles and assemble various parts by solder.

10. Build down upper to contact, build up lower to the same, add Gysi registering instruments (special horseshoe plate without pin on left side), take lateral and condyle tracings. Attach lower to articulator; from this attach upper, first having removed horseshoe plate, etc.

11. Return both to mouth, cut away upper wax sufficiently for thickness horseshoe plates, make rotation point tracing.

12. Grind or stain anterior six, if necessary, set; add bicuspids, upper and lower alternately, giving side movements. Add wax to upper right crowns articulating with lower porcelain, carve and cast.

13. Vulcanize, return to articulator, correct for interference of porcelain and gold, insert and adapt.

In conclusion, the writer wishes to repeat that one of the problems in dentistry today is the removable, sanitary, mechanically correct, efficient, unobtrusive restoration of lost teeth—which will not irritate gingival margins, and the construction of which is well within the reach of the average and near-average practitioner and his efficient and faithful co-worker, the laboratory man. Most important of all, such restorations should be within the reach of the great mass of the semi-edentulous public; and when dental science approaches this ideal, the partial denture to be will play no unimportant part as a means towards that happy end.

2 East Bloor Street.

FOR CROWNING A VITAL MOLAR OR BICUSPID FOR A BRIDGE ABUTMENT*

BY D. A. HOUSE, D.D.S., INDIANAPOLIS, IND.

The tooth is ground conical in shape just beyond its greatest diameter. A pure gold band is fitted on the tooth to the point of grinding. A second band of 22-k. gold is fitted over the first band, the space between the two being soldered. The occlusal surface is made in the usual way, after which the bridge is finished.

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*Clinic, Northern Indiana Dental Society, 1916.

SURGICAL TREATMENT OF CHRONIC ALVEO-DENTAL ABSCESSES*

BY DON M. GRAHAM, M.D., D.D.S., DETROIT, MICH.

THERE is probably no department of dentistry that taxes the skill and ingenuity of the dentist so much as the treatment of chronic alveo-dental abscesses, nor is there any phase of dental surgery that is fraught with such serious consequences to the patient. It would seem that all known drugs and combination of drugs have been suggested and administered in the hope of effecting a cure of this troublesome condition. It is only within recent years when its pathology has become better known to the dentist, that the surgical aspect has been seriously considered by the profession. With the advent of radiography the utter hopelessness of therapeutic attempts at rescuing abscessed teeth whose apical ends have become denuded and resorbed has become apparent to all thoughtful practitioners. It is indeed surprising that so many cases yield to mechanical and therapeutical agencies. If the pericementum remain intact, or only slightly injured, and the patient's resistance be normal, practically all apical abscessed teeth can be put into a state that will admit of obliteration of infectious area.

If, on the other hand, the root-end becomes denuded or pericementum resorbed, pitted and necrotic, and in itself an irritant, there is no amount of therapeutic treatment, ionization included, that will effectually obliterate this focus of infection. The use of our strongest acids is but an attempt at cauterization and chemical curretage, and while the apical area may be bathed in escharotics, the condition is sure to return if there is any considerable protrusion of necrotic resorbed root-end, regardless of how well canal may have been sterilized and obliterated. The fistulous opening may even disappear, and inflammation subside, but withall, we have remaining an irritating bacterial-laden root-end with an area of lowered resistance. Under favorable conditions these latent germs are sure to assert themselves.

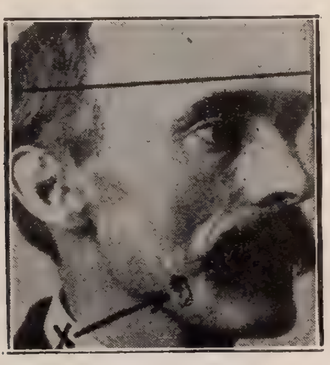

Fig. 1.—Deformity resulting from an infected molar root.

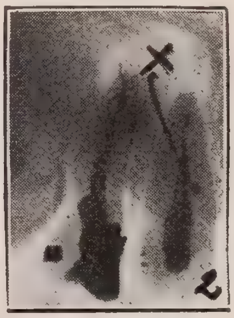

Fig. 2.—Ideal condition for amputation

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*Given as a clinic before the Michigan State Dental Society, 1916.

There is little excuse for prolonging therapeutic treatments if case does not show distinct improvement after canal is sterilized and obliterated. In these cases a good skiagraph will reveal the extent of root impairment as well as the resorptive area surrounding it. Where alveolar abscesses are of short duration, and no great amount of root-tip involved, all the surgical interference that will be demanded is incision and curretage of infected area. This procedure is especially applicable to protruding root-canal fillings and roughened root-tip areas, where the pus has not yet seriously deteriorated the apical end of root.

A number of factors must necessarily enter into the question of surgical intervention. Has the full limit of therapeutic medication been employed to bring about repair? Does the tooth give promise of permanency if this procedure is undertaken and carried to a conclusion, and does the patient place sufficient value on the dental organs to compensate for this time and expense? Until recent years the method of treatment consisted of extractions, and in its favor it must be admitted that it promised, in the vast majority of cases, permanency if not conservatism. Indeed, this alternative must always be borne in mind in surgical treatments of large chronic abscesses of dental origin, for under no circumstances should the general health of the patient be subjected to impairment by the presence of a septic tooth, however reluctant the possessor or the dentist may be to sacrifice it.

Fig. 3.—Amputated roots showing smooth surfaces.

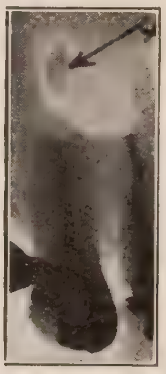


Fig. 4.—Roots well amputated, but retained root-tip delayed repair until its removal.

As already stated, the skiagraph is our best guide in our surgical procedure, and if the tooth has resisted all reasonable attempts at medication, and especially if it has a denuded, resorbed, apical end, we are justified in amputating with more than a reasonable hope that this member will remain comfortable and serviceable for many years. There is little if any likelihood of reinfection if operation is thoroughly done. If tooth has otherwise good osseous support we can safely sacrifice its apical third and still have a serviceable member to our credit. This statement is based on scores of amputations that have been made ten and twelve years ago on teeth which are in a healthy and serviceable condition today. We must ever bear in mind, however, that our enthusiasm may carry us too far in this field, as in other lines of endeavor, and thus bring the whole practice into disrepute.

While it is true that we are operating in a septic field, we should endeavor to perform our operation with the strictest regard for asepsis. The field of operation should be sterilized as well as all instruments, hands, dressings, etc., that no extraneous infection may be introduced. An antiseptic spray followed by a five per cent. iodin solution will suffice for the operative field. The anesthetic of choice is two per cent. novocain-adrenalin solution which is both safe and efficient. With a sharp bistory the soft tissues may be cut over the offending tooth until the process is reached, when tissues and periosteum can be retracted, alveolus removed with chisel or bur until root-tip is brought into view. After thorough sponging, a protruding and offending tip can now be amputated by burs and smoothed by stones. Good surgery demands that the operation be thorough and that all necrotic and carious tissues be removed. Cutting into healthy tissue is always a wise precaution in this operation if we are to be successful. As a mild reinfection and considerable swelling may follow, every precaution should be taken to put the wound in an aseptic condition. It should be washed out with a mild antiseptic solution and packed with iodoform or some other medicated gauze which should be changed every forty-eight hours. When granulation tissues have made their appearance about the amputated end, we have but to protect these repair cells until they have obliterated the wound. In the

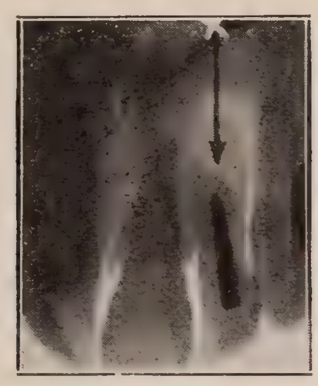


Fig. 5.—Infected teeth in close proximity to antrum, making amputation in this region somewhat hazardous.

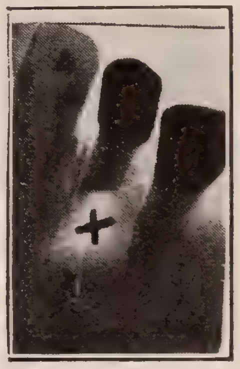


Fig. 6.—This type of tooth cannot be amputated for insufficient osseous support.

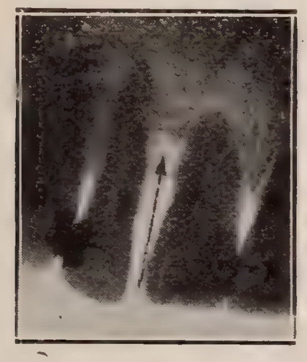


Fig. 7.—Fully one-half of root resected, but tooth has done service for ten years.

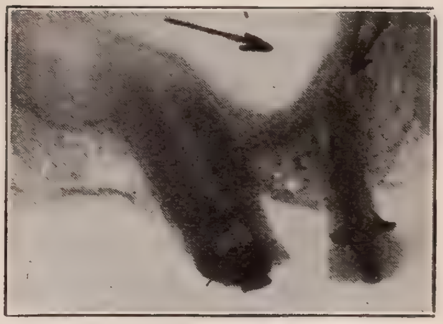
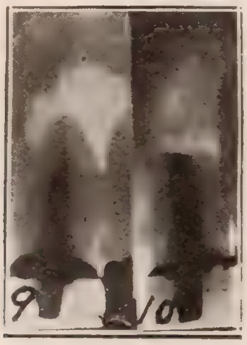


Fig. 8.—Apical third of root can be safely removed.

latter stages wax can profitably be used and by reducing it in size the wound is allowed to heal under the eye of the operator.

It will be seen from this procedure that immediate closing of wound after root amputation is not recommended as a routine practice, for the reason that results have been sometimes unsatisfactory. Where a large incision is made, sutures are used, but provision is always made for drainage and packing. Indeed, incisions at buccal-gingival junction are self-closing and the number of sutures in this region need be but few and preferably of horse hair.

The vast majority of alveolar infections are of dental origin, but not infrequently we find them in the edentulous mouth and edentulous areas, although these may be the result of a previous dental infection. Chronic apical abscesses do not always happily terminate with the removal of the offending tooth. An infective detritus sometimes remains in the alveolus, with the result that resorption and osteitis proceed apace. In these cases we are to follow approved surgical procedure, opening into cavity, removing its septic contents with all its carious and necrotic tissue, washing and packing, as before, being especially careful to conserve all healthy tissue and periosteum that we may not mutilate the dental arch and make difficult the insertion of a dental restoration.



Figs. 9 and 10.—A typical tooth where therapeutics fail and resection is indicated.

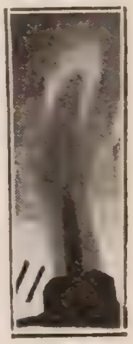


Fig. 11.—A candidate for resection after canal is filled.

In the so-called pericemental abscess the condition is puzzling and difficult of diagnosis, and treatment also on account of vital adjacent teeth. It is often a wise procedure to devitalize these teeth if radiograph shows their foraminal ends in close proximity to the abscess sac and therefore their vitality endangered by operative procedure. Opening, curretting and packing, as before, is demanded. Prognosis in practically all cases of alveo-dental lesions is good. The abundant blood supply of the tissues undoubtedly contributes to early and permanent repair, which is shown in no other part of the human anatomy. With a correct diagnosis, surgery of these conditions will give happy results most pleasing to operator and patient.

David Whitney Building.

A DENTIST WITH THE MILITIA

BY LIEUT. JOHN W. PUFFER, 2ND INDIANA.
PROFESSOR OF CROWN AND BRIDGE WORK, INDIANA DENTAL COLLEGE, INDIANAPOLIS.

THE CARE OF THE MOUTHS of the soldiers on the Mexican border was indeed a problem. Many of the men were demanding dental service that they could not get.

In the first place, the dental corps of the militia was not well organized until some time after the troops reached the border; then there was a long wait for equipment after the appointment of dental surgeons. Most of the men were sorely in need of dental work, as examination later proved. Until equipment was obtained, about the only way these men could be relieved was to extract the offending tooth, which in many cases was a great sacrifice. An examination of 3800 men showed that 94¾ per cent. of these men were in need of dental services. One can readily see the enormous amount of work that would be necessary to put the mouths of the many thousand militia men in a healthy condition.

Most of this work the men should have had done some time before they were ever called into the federal service, but since it was not done, it at once became a problem of the government to take care of their dental work, in order to keep the men well and effective.

We were very fortunate in securing a room in an old hotel that was being used for a camp hospital. This made a very comfortable place, and with some able assistants it soon looked like a real dental office. Here we were able to relieve all suffering of a dental nature, but it was impossible to treat and restore teeth as we felt they should be, using the equipment that was at our disposal.

This was the most disappointing thing about the service. Let me say right here that the co-operation of the officers was all that anyone could ask for, in trying to see that their men were properly cared for in every respect. I enjoyed the experience and think it is a fine thing for any young man.

Later, when the new hospital was built, a very good dental office with skylights and the necessary rooms was arranged for.

Each dental surgeon has a hospital corpsman assigned to him as his assistant, and he keeps the instruments sterilized, makes a record of all work done for each patient, and keeps things in tip-top shape about the office.

One day a soldier came in and said, "Doctor, I'm up against it. I can't eat a thing but a little soup." I asked what the trouble was, and he showed me a full upper denture that was broken in three pieces. (I don't know how he got into the service, but he had to be taken care of.) Such a case would have been easy to handle in private practice, but in this case it would be necessary to write for authority to have the necessary repair made, and then if same was granted, the plate would have to be sent away for repair; so Mr. Soldier would have to eat soup for some time. Then there was a good deal of pyorrhea, some cases so bad that extraction was indicated, because the patient was swallowing a quantity of pus every day and the teeth were too sore to attempt to do much masticating. What was the best thing to do? We were not equipped to do any plate work. We didn't even have an impression tray. I treated the case the best I could and told the patient that I thought it would not be long until he was mustered out and then he could have the extracting done and a plate made.

Here comes a man who has an anterior crown broken off, having received a blow in the mouth, or maybe this fellow has to have an upper central root extracted. Just how to take care of such cases is a problem when you have to eliminate crown and bridge and inlay work from your possible restorations, yet these men, in my opinion, should be entitled to this class of work.

If the army dental surgeon is going to have to limit his restorations to amalgam and silicates, then it seems to me that there should be enough dental surgeons so that every man could be compelled to make a visit to the dental office at least every four months and have his teeth cleaned and all small cavities filled. If this is left to the discretion of the soldiers, a large percentage will let their teeth go (and this doesn't apply only to soldiers by any means) until treatment is necessary and a crown often indicated or possibly an extraction.

There is really only one time to have dental work done, and that is when the first sign of an abnormal condition appears. If this were done *our dental force would have to be doubled at once.*

People would hardly know what it is to have toothache, abscessed roots, unsightly crown and bridge work and plates that "just won't stay up;" but I am getting off the subject. While a systematic inspection is not possible in civil life, yet I believe it is in the army and I also believe it should be done. Anyway, it is something to think about and I am sure would do a lot of good if practiced.

I do not mean to leave the impression that the government is not trying to provide the soldiers with the proper dental service, but I do believe it is something that has been neglected in the past, and I feel that the corps has not received the proper support from the profession at large to put it on the plane it should be.

If each dental surgeon would be raised to the rank of captain after five years' service and then could work on up the scale, more of the better men would be attracted to the service.

My only reason for writing this article is to try and interest the profession in the dental corps so that it may become an efficient organization, properly equipped and large enough to do the work as it should be done.

The corps already has some splendid men who, through their untiring efforts, have brought about some marked results and they are deserving of our full support.

WHAT WILL *YOU* DO IN CASE OF WAR?

BY J. W. BEACH, BUFFALO, N. Y.
CHAIRMAN PREPAREDNESS LEAGUE OF AMERICAN DENTISTS

THE TIME HAS COME! Our nation is facing one of the gravest crises in its history! As a profession we are in position to render to our government and to our fellow-men a service not to be equaled by any other organization of specialists. Will we accept the challenge? Positively and unflinchingly, Yes! We will rise to the fullest needs of the emergency and prove our value and sincerity as a public service agency in our important field.

It is truly said that an army fights on its stomach and teeth. This statement covers the whole situation. As monitors of the teeth we are supervisors of the stomach; hence, an army is helpless without our professional offices. We must, therefore, become a united army within ourselves and throw our whole energy into the work that is before us.

First of all, we must have organization. Next must be formulated sane and sound plans for action. These plans must be carried forward by men of capacity, influence and experience. The Preparedness League of American Dentists supplies the necessary organization and the following names represent the directors and dictators of the League: Board of Trustees, Thomas P. Hinman, Harvey J. Burkhart, Otto U. King and Frank W. Low. Advisory Board, representing the National Dental Association: E. C. Kirk, Lafayette L. Barber, Herbert L. Wheeler, H. E. Friesell and S. D. Boak, Dental Corps, U. S. Army.

It is needless to comment on the peculiar fitness of these men nor to refer to the value of their united efforts in forwarding any movement for the welfare of humanity or our great profession. These men love their chosen calling, live for it each day and no effort or sacrifice within their power is too great to make its usefulness more potent.

We want *you* and every other member of the National Dental Association to join the League and, if possible, agree to prepare the mouth of at least one applicant for enlistment to the National Guard, Army or Navy, who has been rejected because of defective oral conditions and is unable to pay for the necessary dental service, so that he may meet the requirements of the examining officers. We request that all such work be reported to the League headquarters.

Next, we want you, if possible, to join the Officers' Reserve Corps, Dental Section, of the army and equip yourself by joining a sectional unit of the League in your city or neighborhood and study the prescribed course in oral and dental surgery which will prepare you to pass the examination for entrance to this corps. Successful applicants are commissioned as First Lieutenants with salary of $2,000.00 a year when in actual service. There is neither number nor age limit, and none will be called to service except in event of actual war. The League will supply application blanks and has the assurance of the Surgeon General's Department that less formality will be required of applicants vouched for by this organization.

Our ambition is to give our government the largest, most efficient and most representative Officers' Reserve Corps, Dental Section, of any nation of the world. This we owe to our country and to our profession alike. Do *your* part today and thus assure its accomplishment.

All further information regarding Reserve Corps, Sectional Units, etc., may be obtained at League headquarters. Those wishing to join the corps kindly send full name, whether or not a member of the N. D. A., college and date of graduation. If not already a member of the League, we earnestly request you to become so by enclosing one dollar ($1.00) for active membership. This is much needed to cover postage, printing and other necessary expenses, the clerical work being done gratis by the secretaries of the officers of the League. Address, Preparedness League of American Dentists, 3 Professional Bldg., 131 Allen St., Buffalo, N. Y.

Do It Today!

Just a Lending Hand

There are loyal hearts, there are spirits brave,
There are souls that are pure and true;
Then give to the world the best you have,
And the best will come back to you.

Give love, and love to your heart will flow,
A strength in your utmost need;
Have faith, and a score of hearts will show
Their faith in your word and deed.

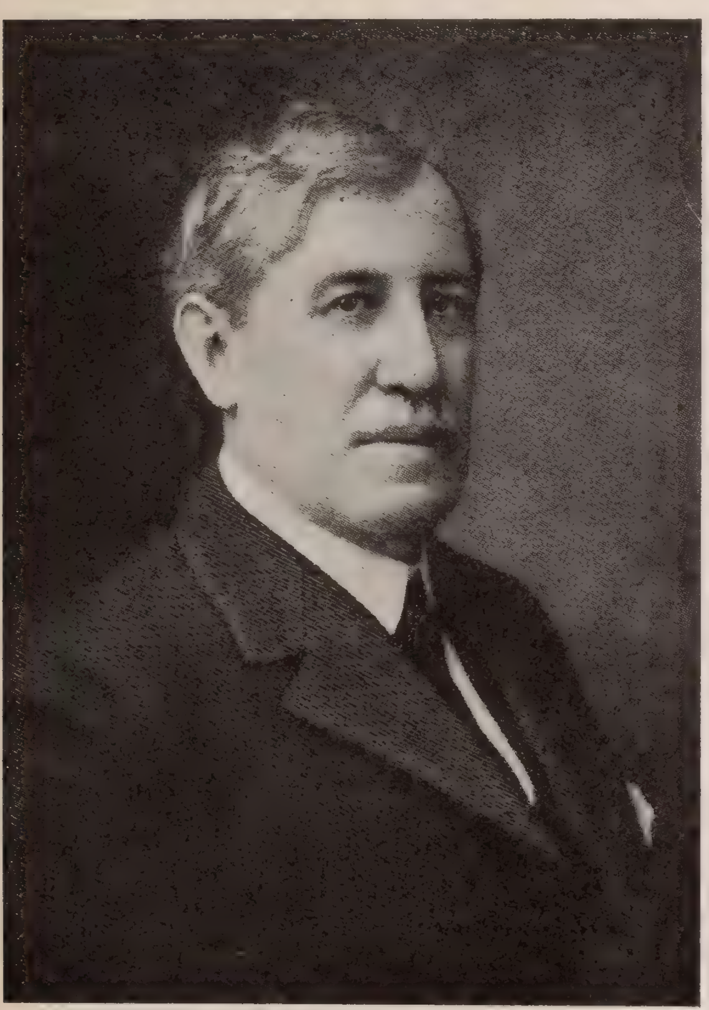
For life is the mirror of king and slave,
'Tis just what you are and do;
Then give to the world the best you have,
And the best will come back to you.

—Madeline Bridges

THE FORSYTH BANQUET

BY DR. J. WILLIAM O'CONNELL, WAKEFIELD, MASS.

[DISTRICT EDITOR, THE DENTAL SUMMARY]



Thomas A. Forsyth

THOMAS ALEXANDER FORSYTH, founder of the Forsyth Dental Infirmary for children, on the evening of January 20th, at the hotel Somerset, Boston, amid the cheers of over three hundred dentists from all parts of the country, received a silver loving cup and tributes of silvern eloquence from Gov. McCall, Mayor Curley, President Lowell, of Harvard University, and others.

The dinner and presentation to Mr. Forsyth was the result of a plan laid more than a year ago to honor the genius and generosity of the surviving member of a family of public benefactors. Contributions toward the loving cup were made in small sums by dentists from all over this country and abroad, and were received by Dr. W. W. Belcher, editor of *Oral Hygiene,* to whom great credit is due for his unselfish and untiring efforts. Much credit is also due to the local committee under the capable direction of Dr. Albert Midgely and Dr. Percy R. Howe. If ever there was a man worthy of the felicitations, the blessings and the honors accorded him, he is the gentleman, known now throughout the civilized world as one of the greatest benefactors to humanity of all time, in whose honor over three hundred dentists from every section of the United States and Canada assembled to convey the loving esteem and gratitude of the entire dental profession of the world.

Retiring, modest—almost to the point of self-effacement—nowhere can be found a better example of sublime humility, as surely nowhere in the world can be found a work which transcends in importance and in silent expression of love for his fellowman that for which Mr. Forsyth is responsible.

His noble, kindly face fairly beams with love for his work, and seems to say: It is nothing; I do only my duty. I simply am satisfying my great love for the little ones and doing what I love best to do and what my beloved brothers waiting for me on the far-distant shore would that I should do.

That he should be honored by the presentation of the dentists' loving cup was eminently fitting and proper and must have been to him a slight indication of the love in which he is held amongst dentists of the entire world. It was a day not alone for the dentists to pay tribute to the great philanthropist, however, for the city of Boston, through its street commissioners and at the suggestion of His Honor Mayor James M. Curley, changed the name of Bryant street, which is adjacent to the infirmary, to Forsyth street, thereby according him the honor never before bestowed on any living citizen of giving his name to a street. In addition, Dean Friesell, of the Dental Department of the University of Pittsburgh, announced that the trustees of that institution had voted to confer on Mr. Forsyth the degree of Doctor of Laws, the highest degree in the gift of the university.

Seated at the head table was the guest of the occasion, Mr. Forsyth; Gov. McCall, Mayor Curley, Dr. Lafayette L. Barber, president of the National Dental Association; Dr. William H. G. Logan, toastmaster; Dr. H. Edward Friesell, Dean of the Dental Department of University of Pittsburgh; President A. Lawrence Lowell, of Harvard; President Herman C. Bumpus, of Tufts College; Dr. E. H. Smith, Dean of Harvard Dental School; President H. H. Cleaveland, of the Massachusetts Dental Society; Dr. Harvey W. Wiley, famous pure food expert; Dr. Joseph Head, Dr. Truman Brophy, Dr. W. W. Belcher, Dr. R. R. Andrews, Dr. E. A. Bogue, Dr. Gillette, Dr. J. A. McAllister, Dr. James McManus, Dr. E. S. Gaylord, Dr. J. D. Patterson and Dr. E. C. Briggs.

The head table was beautifully decorated with flowers, particularly noticeable being a huge basket of red roses from Mr. A. Shuman, chairman of the Boston City Hospital trustees, of which board Mr. Forsyth is a member. Mr. Shuman was unable to be present on account of poor health, but a letter from him was read by the toastmaster, testifying to the high esteem which he bears for the honored guest.

During the dinner there was fine quartet singing and orchestral music, and when the speaking commenced a large number of women friends of the visiting guests took seats in the balconies.

In his introductory remarks Dr. Barber referred to Mr. Forsyth as "one of the greatest benefactors of the human race, inasmuch as he aims to mitigate the sufferings of the poor, many of whom suffer as long as they live." On behalf of the National Dental Association he assured Mr. Forsyth that he possessed the undying affection of the entire dental profession. He then introduced Dr. Wm. H. G. Logan, of Chicago, who proved a most capable and efficient toastmaster.

On being presented, His Excellency Samuel W. McCall, Governor of Massachusetts, stated to Mr. Forsyth that the tribute paid to him by the presence of dentists from every state in the Union was an unique and glorious one, and conveyed to the honored guest and the entire assemblage the greetings of the commonwealth of Massachusetts.

Mayor Curley, the next speaker, said: "Thanks to Thomas Forsyth, Boston will soon have not only the splendid dental infirmary which he has founded, but also the first whooping-cough hospital in America. Whooping-cough, a minor malady among the well-to-do, at times makes the undertaker's wagon as common as the newsboy in the tenement districts, where the families are as large as the weekly wages are small, and the impossibility of isolation turns the ailment into a deadly menace.

"As a City Hospital trustee, Mr. Forsyth has laid the foundation for the greatest group of children's hospitals for the treatment of infectious diseases in the world. Fortunate are we in recognizing the worth of this great American while he is with us in the flesh."

The mayor then read a very appropriate poem, "Sad, Poor Little Faces," about the man who would sow pennies and reap smiles from amongst the poor children of the land. It was at this time that Mayor Curley announced "that in recognition of the generous action by which Mr. Forsyth had lightened heavy hearts and replaced tears with smiles, that the city was according him the honor never before bestowed on any living citizen of giving his name to a street, Forsyth street, to stand for genuine human service without regard for race, creed or color."

President Lowell, upon being introduced by Dr. Logan, said: "If it is more blessed to give than to receive, Mr. Forsyth must be a happy man tonight. He desires no recognition and is modest to the extent of avoiding any publicity for his sake. Yet when the whole profession gathers to honor his insight in recognizing a real need—such as the infirmary for children—he must indeed feel pleased and happy. To give is not uncommon, but to give wisely is a great accomplishment and that is what Mr. Forsyth has done."

President Bumpus, of Tufts College, read a poem written by Dr. Oliver Wendell Holmes, as a tribute to George Peabody, "To the Friend of All His Race, God Bless Him," appropriately applying it to Mr. Forsyth.

Dr. Eugene H. Smith, Dean of Harvard Dental School, very clearly and cleverly analyzed the relation of New England dentists to the Forsyth Dental Infirmary. He affirmed that Mr. Forsyth was the greatest of dental philanthropists. "While the infirmary," he said, "does not offer a wide field of experience, except in applied psychology, all local dentists should rejoice at the opportunity it offers them to do their part for preparedness, either as regards military or industrial efficiency, and should gladly give some sacrificial service for the betterment of the race. The project has been nobly conceived and generously carried out."

Dr. Harold B. Cleaveland, of Springfield, speaking on the subject of "The Spirit of Service," added his chapter of praise in a most eloquent manner and stated it as his firm conviction that the Forsyth Dental Infirmary will do wonders in making dentists better servants of the public and of humanity.

Dr. H. Edmund Friesell, who made the presentation of the loving cup to Mr. Forsyth, was next introduced by Dr. Logan. The cup, now for the first time exhibited to the admiring gaze of everybody present, is a beautiful vessel of Tiffany design, and truly is a symbol of love and keen appreciation. It shows eighteen figures of happy-faced children in graceful postures, expressive of health and unalloyed happiness, which the Forsyth Infirmary has made attainable to so many little sufferers.

Dr. Friesell, in glowing words, recounted the history of the Forsyth family, referring particularly to the honored guest's sister and three brothers. He called attention to the birth of the idea with James Bennett Forsyth and of his leaving in his will a bequest of $500,000 to found such an infirmary as now exists; of his dying without signing the will; of how John and Thomas, faithful to the wish of their dead brother, allowed this $500,000 to be used as he had desired, and added $1,500,000 to it, thereby establishing a foundation of $2,000,000. John died before the memorial was completed and Thomas Alexander added $2,000,000 more, "thus giving Boston a safeguard as valuable as all the hospitals, for since the mouth is the greatest field of infection, this is a wall at the precipice of disease much better than an ambulance in the valley. It will also lessen friction between the rich and the poor and add to the dignity of the dental profession." In presenting the cup to Mr. Forsyth, he said: "You, sir, are the wealthiest man in the world, not only in the possession of the esteem of the entire dental profession, but also in the countless blessings of generations of children to come."

The cup bears the following inscription:

> "To Thomas Alexander Forsyth, from the dentists of all nations, in appreciation of the benevolence of the Forsyth family, who gave to humanity the Forsyth Dental Infirmary for children, 1917."

In responding to the presentation, Mr. Forsyth said:

MR. TOASTMASTER AND FRIENDS: It will be impossible for me to express to you my appreciation of the great honor you have done me in tendering this banquet and presenting this magnificent loving cup. It is the greatest honor as well that such a goodly number of your distinguished profession should have gathered here from all parts of the country to be present upon this occasion.

I assure you, good friends, that I was pleased when I learned that the purchase of this cup had been donated to by more than 5,000 friends and well wishers. And these, too, from all parts of the country as well as from without our borders.

The occasion surely is one of considerable import in the history of the Forsyth Dental Infirmary, for by your donations to this beautiful cup as well as your attendance this evening, you have very positively bespoken your interest in the institution, in its work for the cause of humanity, and its fostering to the needs of the little ones.

I can but feel certain that the Forsyth Dental Infirmary has attained a position of more than local interest and importance, for I believe in its pioneer working it has set that example which, ultimately, is sure to be followed in every city in our country, as well, indeed, as throughout the civilized world.

The future of our beloved country depends, of necessity, upon its children, and I can conceive of no more essential factor in their individual efforts for their future good service than their bodily health, and that is inseparable with mouth hygiene.

This tribute is a wonderful manifestation of your friendliness to the infirmary, your whole-hearted interest in the work undertaken and so splendidly forwarded during the past two years. And, finally, your loyalty, your desire to co-operate, to lend that helping hand so essential if the greatest return is to be given for our efforts.

For the Forsyth family I wish to offer thanks to all who have so cheerfully donated to this loving cup; to the gentlemen of the committee who have so efficiently cared for their numerous duties, and, not in least part, by any means, you for your attendance tonight.

It has been an evening of grateful and sincere thanks from me to you all. Again, Mr. Toastmaster and my friends, I thank you.

FINISHING AMALGAM FILLINGS

In finishing amalgam fillings, some teachers recommend drying off to a hard surface by pressure, with either bibulous paper or tin foil. Both of these practices, to my mind, should be strongly condemned, for the reason that the excluded mercury contains a certain proportion of the combined metals, and also because, when tin foil is employed, the correct proportions of silver and tin are altered so as to result in expansion or contraction of the amalgam. My practice, therefore, is to have my assistant mix a certain proportion of the amalgam to almost a powder, which I work into the filling when nearly completed, thereby securing a hard filling with a more equable proportion of the constituents of the amalgam. I believe also in making, in nearly all cases, the amalgam fillings practically into inlays by burnishing the amalgam into the moist cement, thereby producing a much better filling.

—W. N. Short, *Commonwealth Dental Review. Dental Cosmos*

ORAL SURGERY
CASE REPORTS

CONDUCTED BY HUGH W. MacMILLAN, D. D. S., CINCINNATI, OHIO

THIS DEPARTMENT AIMS TO REPORT INTERESTING ORAL SURGERY CASES IN BRIEF FORM, ILLUSTRATED BY RADIOGRAPHS AND PHOTOGRAPHS WHERE POSSIBLE. ARTICLES FOR THIS DEPARTMENT MUST NOT BE MORE THAN 500 WORDS IN LENGTH. SEND CONTRIBUTIONS TO DR. HUGH W. MACMILLAN, UNION CENTRAL BUILDING, CINCINNATI, OHIO.

Case I: An unusual fracture case; F. C., aged 29, was struck by heavy blow on the right side of the face, receiving fractures of the necks of both condyles and oblique fracture of the body of the mandible near symphysis, complicated by anterior dislocation of heads of condyles. The upper process and teeth on the right side were knocked loose in such a manner that they could not be splinted. (Case reported by Dr. MacMillan.)

Case II: A lower first molar impacted by an odontoma; B. S., aged 15, had suffered severe pain for four months. The radiograph showed an odontoma composed of the second and third molars. The first molar is shown impacted by the growth. The odontoma was removed by extracting the second bicuspid and burring away the bone to permit elevation of the growth from its bed. The first molar was then easily removed. The operation was performed from inside the mouth, under ether, and without fracturing the jaw. Following the operation the boy gained thirty pounds. (Case reported by Dr. MacMillan.)

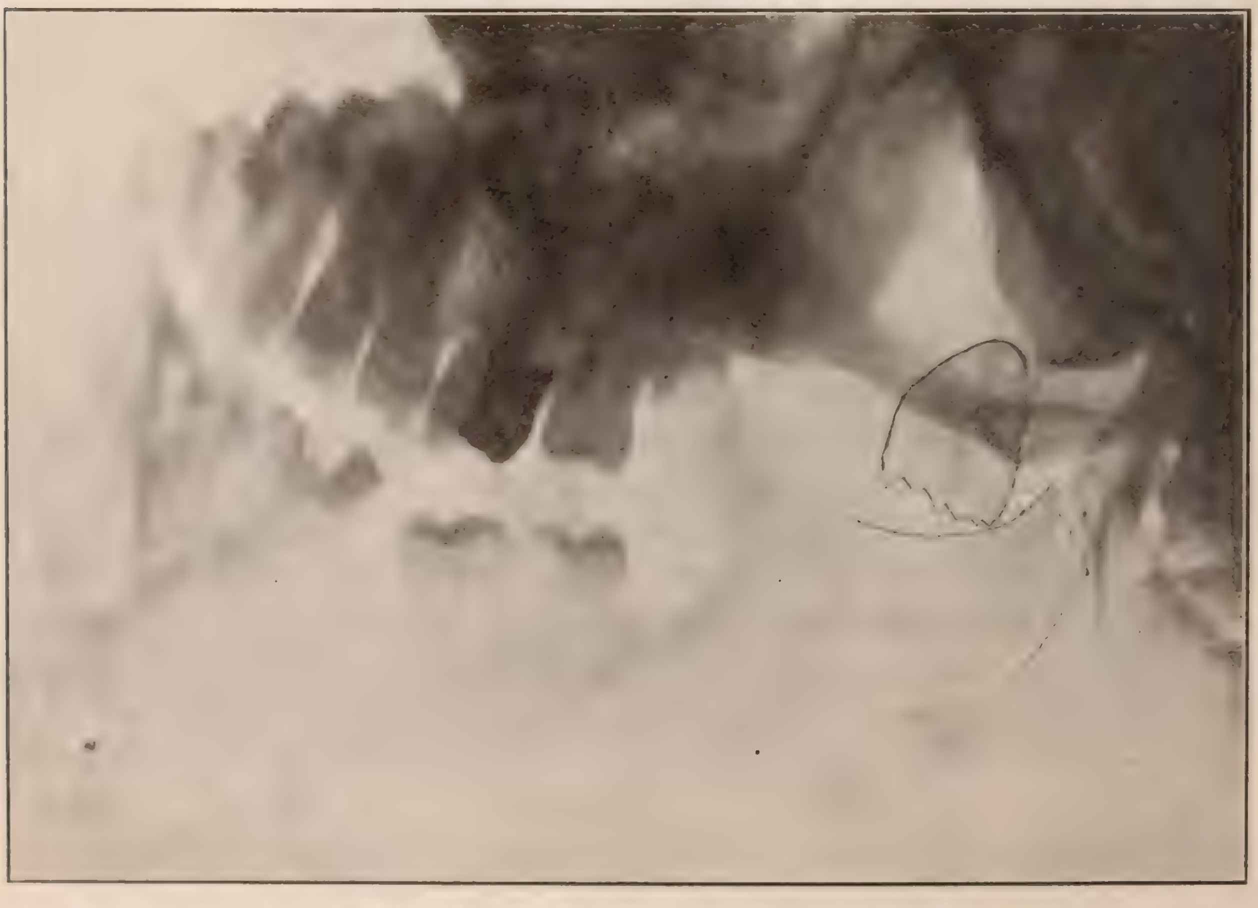


Fig. 1. Case I.—The left side, showing extensive displacement of head of condyle.

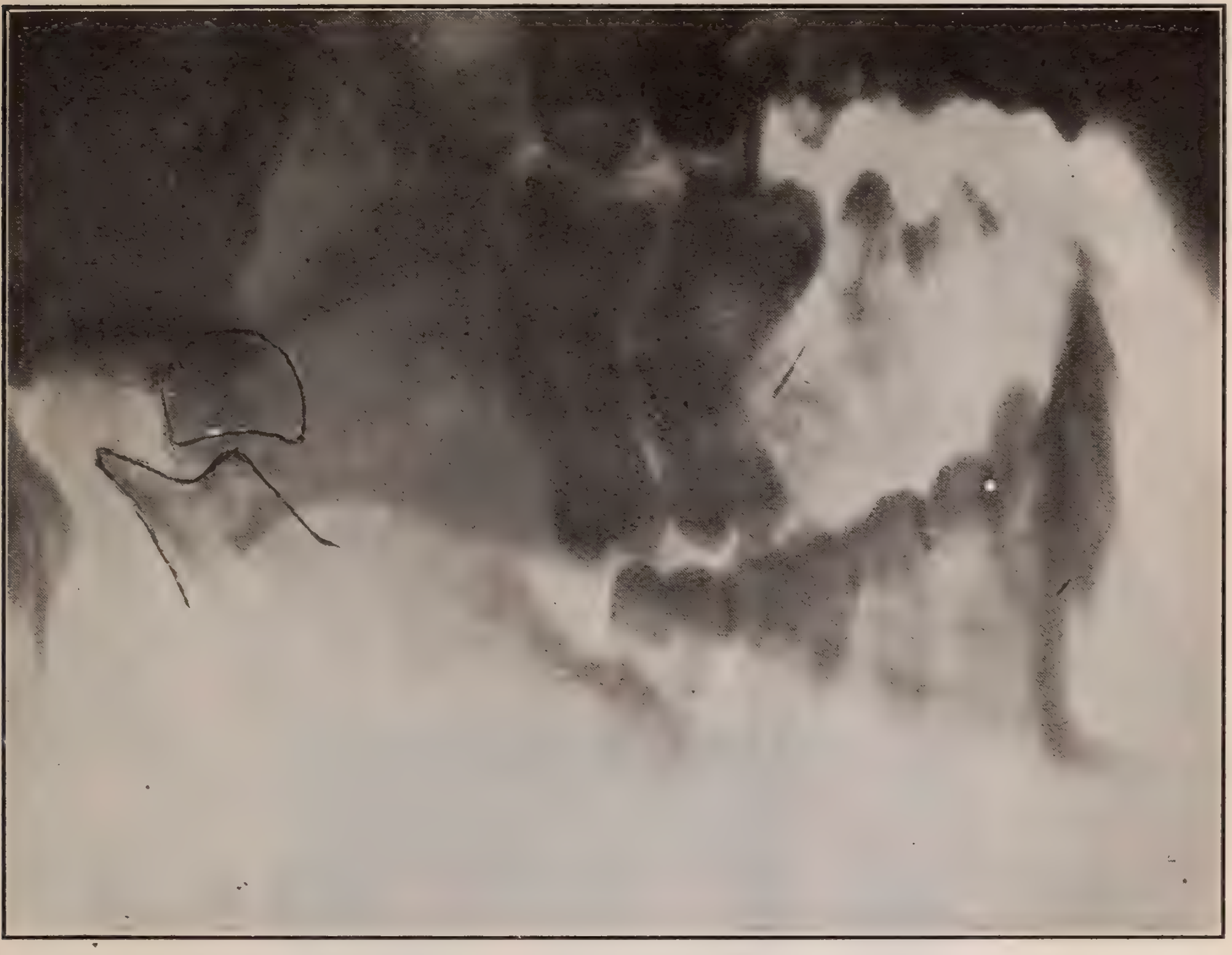


Fig. 2. Case I.—The right side, showing a lesser degree of displacement, the condyle resting on the anterior aspect of the eminentia articularis. This radiograph also shows where the upper teeth are missing.

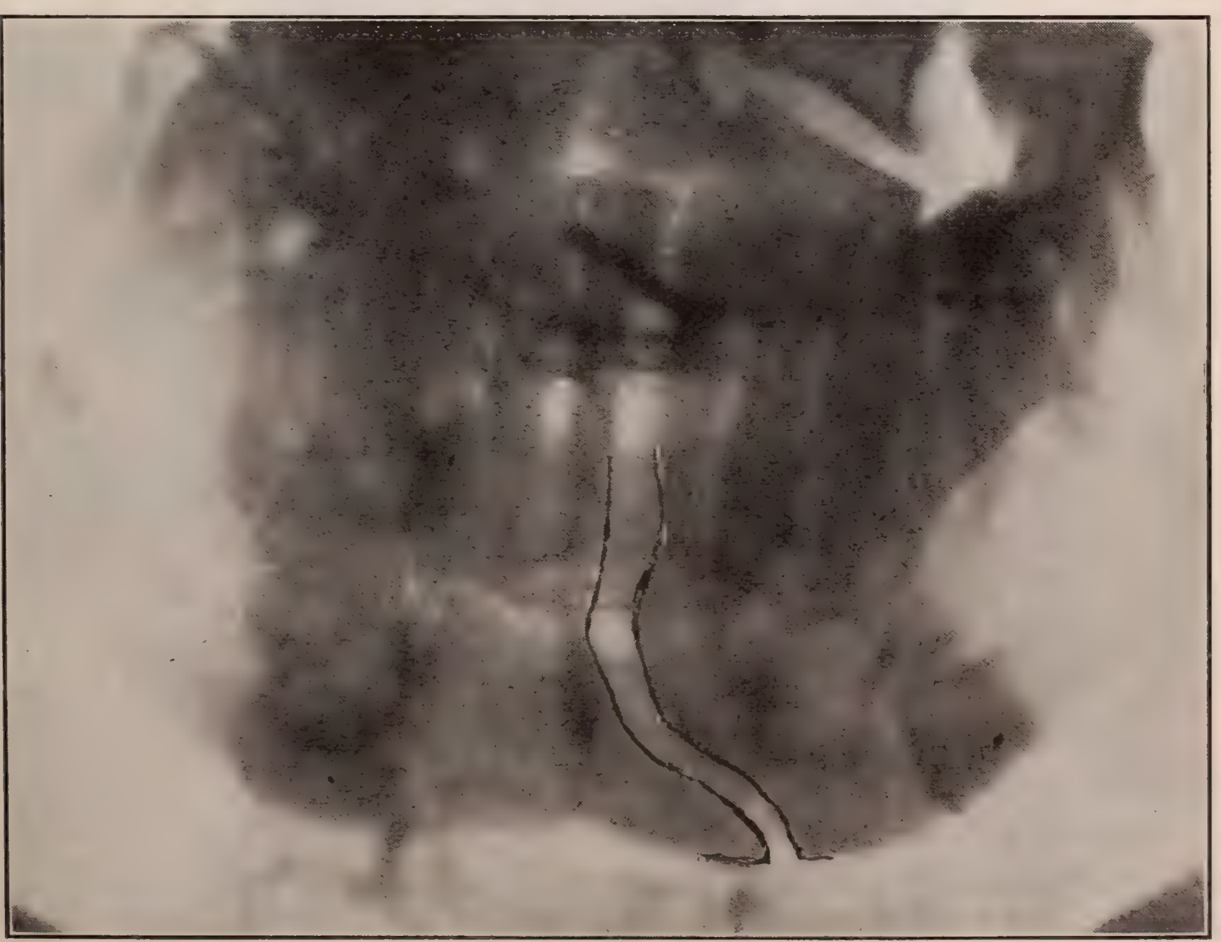


Fig. 3. Case I.—An anterio-posterior view showing oblique fracture near symphysis. This picture was taken after jaws were wired temporarily.

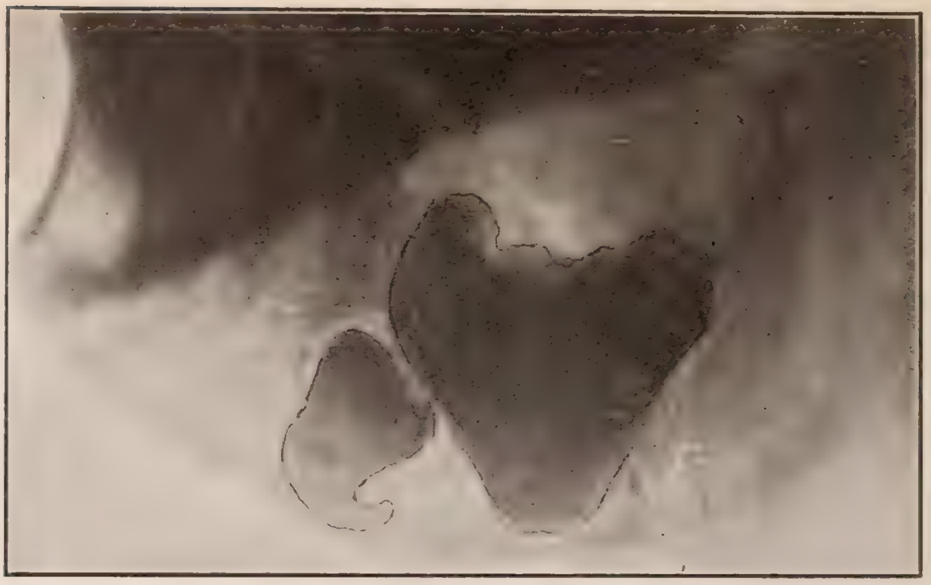


Fig. 4. Case II.—Showing odontoma and impacted first molar in situ.

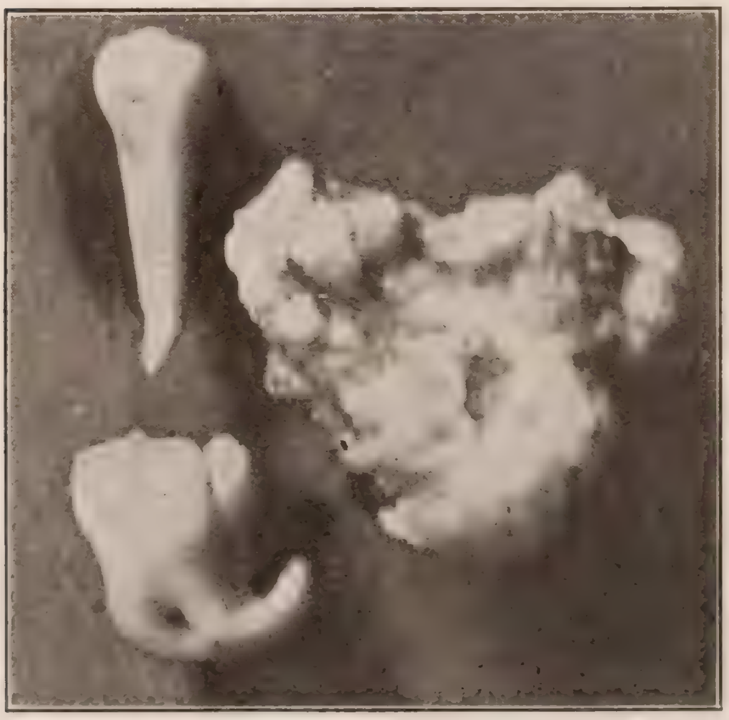


Fig. 5. Case II.—Actual size of removed tissue.

VULCANITE FINISHING

A convenient tool for finishing the interproximal spaces between the teeth of a denture can be easily made from a long-handled instrument of the cutting variety that still has the temper. Simply grind it into a long tapering point somewhat thorn shape. By a careful thrust the annoying piece of vulcanite can be easily and neatly removed.—*Pacific Dental Gazette.*

CORRESPONDENCE

THE RECENT MEETING OF THE OHIO STATE DENTAL SOCIETY

BY DR. J. W. SIEGFRIED, DAYTON, OHIO

(Censor Fifty-first Meeting)

EDITOR DENTAL SUMMARY:

When I read Dr. Sage's criticism of the state convention in Dayton the first time, I started a letter to you something like this: "At last, the Dayton meeting is a real convention—the first kicker has been unearthed, and we have something to do, now that the battle is over, in that we can write letters to the editor and cavort about in grisly retaliation on any man so bold as to dare insinuate that our meeting was not one hundred per cent. perfect."

Then I read it again and changed my mind. His remarks are not so scathing after all—in fact, if he meant to be cutting he failed in the attempt. But "*en passant*" and likewise "*entre nous*" (my dictionary has a supplement of foreign phrases, too), I wish to say that if the good doctor had sent his friends to the information booth at Memorial hall, they could have been supplied with good rooms at any time during the convention. We take it that all our guests came to enjoy the convention, rather than to spend their time in luxury and riotous living at our magnificent hotels!

The one good-natured witicism indulged in by any paper was the "pulling, filling, plugging" headline carried by the *Journal*. We were unusually fortunate in getting the co-operation of all the papers early in the game, and as a whole the press matter was readable and dignified. The three papers gave us thirty columns of space during the convention week—a record without parallel in our annals, I believe. I can assure the doctor's friend who, for the moment, was "The Autocrat of the Breakfast Table," that the *Journal* did not mean to be mean or little in its headlines, and I doubt if the laity would have considered them even undignified. I believe in dignity; it is an asset to be proud of, but in being dignified we must not forget to be human, nor lose entirely the other fellow's point of view. Thanks to Dr. Sage for being big enough to see it, even if his friend couldn't.

As to the Oral Hygiene dinner at the Miami Hotel, we were, most of all, disappointed in the service. However, we had present one hundred more than we had any right to expect would be there, and so many handed their reservations in at the last moment that we were swamped. At the next one it may be that the attending dentists will know the dinner is for instruction, and purpose; and those who came just for the good time they thought they were going to have will stay away and let the interested men go and receive the benefits they expect. Who could have foreseen that five hundred men would want to attend an Oral Hygiene dinner?

We thought that Dr. Germann handled the clinics so much better than they had ever been handled that he would at least escape. But he also "escaped not the unsparing hand of barbarous force." I presume that no building in the country is fitted rightly to handle dental clinics, and while the criticism of not being able to see and hear is probably correct, there was not one time when I went into the clinics that there were not vacant seats close to the speaker. But of course, I was not an attendant throughout any one, and two I missed entirely.

And so we leave the good doctor "*stans pede in uno*!" And more power to his elbow!

I. S. D. A.—*Official*

TO THE COUNTY CHAIRMEN

Dear Doctor:

There has been introduced in the House and Senate a bill known as House Bill No. 436, and Senate Bill No. 252, providing for (*a*) the appointment of all members of the State Board of Dental Examiners by the governor; (*b*) that all graduates of dental colleges in Indiana be registered without examination and for a fee of $2.00, graduates from all other colleges being required to take the examination; (*c*) changing the reciprocity clause so that any person who has been in practice for five years, regardless of his morals or standing may be admitted to practice in Indiana without examination, either theoretical or practical.

The appointment of three members of the State Board by the Indiana State Dental Association has been one of the strongest features of the dental law since 1879 and has insured the state of the services of men of the very highest type. This method of appointment has been indorsed and commended by the Supreme Court of Indiana and has given Indiana a reputation among all the states as being far in advance in this respect.

The second clause which would discriminate in favor of graduates from Indiana Dental College can only be classed as "class legislation." It would subject the dental profession of Indiana to criticism from every state in the Union and would provoke retaliatory measures from all state boards that would make it impossible for dentists from Indiana ever to secure admission to practice in other states. It would be contrary to the best interests of dental education.

The third section is impossible of application because under its provisions no state would be able to enter into reciprocal agreements with Indiana, and therefore all reciprocal relations heretofore secured by the diligent efforts of the State Board under the present law would become null and void.

These bills (House Bill No. 436 and Senate Bill No. 252) are pernicious in the extreme and should be opposed by the Indiana State Dental Association in every particular.

It is being urged by the same crowd which has fought all good dental legislation, now and in the past.

We urge you to at once get every dentist in your county to join in an appeal to your representative and senator, to oppose it in every way.

We would suggest that you use the reasons set forth in this letter and that you take action immediately, as it is urgent that House Bill No. 436 and Senate Bill No. 252 be killed.

Write or telegraph to your senator and representative immediately. Ask him to kill House Bill No. 436 and Senate Bill No. 252, and use his efforts to pass House Bill No. 128.

(*Signed*) LEGISLATIVE COMMITTEE.

HOUSE BILL NO. 436

A BILL FOR AN ACT to amend Section two (2), Section three (3) and Section fifteen (15) of an Act entitled "An Act to Regulate the Practice of Dentistry," approved March 8, 1913.

SECTION 1. Be it enacted by the General Assembly of the State of Indiana, that section two (2) of the above entitled act be amended to read as follows: Section 2. A board of examiners, consisting of five reputable practicing dentists, who shall have been in practice in this state for not less than five (5) years, shall be appointed on or before the last Tuesday of June, 1913, and biennially thereafter, by the governor, said board to serve for the term of two (2) years from the date of such appointment; Provided, That the members of the present board as now constituted shall serve until the members of the board are appointed under the provisions of this act. When convened, said board shall examine all applicants for certificates of qualification who present the credentials hereinafter provided and issue such certificates to all such applicants as shall pass a satisfactory examination; except that any applicant holding a diploma of examination from a recognized school of dentistry of the State of Indiana shall be exempt from examination.

SECTION 2. That section three (3) of the above entitled act be amended to read as follows: Section 3. After this law goes into effect any person desiring to begin the practice of dentistry in this state shall procure from the state board of dental examiners a certificate that such person is entitled to practice dentistry in the state of Indiana, and in order to procure such certificate the applicant shall submit to the state board of dental examiners his diploma from a dental college recognized by the national association of dental faculties, or holding a license from the state board of dental examiners of Indiana. Every such applicant, except those holding certificates of graduation from a recognized school of dentistry of the state of Indiana, shall pay to the board twenty dollars ($20) at the time of making such application, and shall pass an examination before the board at a time to be fixed by the board. Provided, however, That the fee for a re-examination, or any subsequent examination, shall be only ten dollars ($10); and Provided, further, That if such applicant shall fail to pass the examination prescribed by said board, he shall have the right of an appeal to the circuit or superior court of the county in which he resides requiring said board to show cause why such applicant should not be permitted to practice dentistry, upon the applicant giving a good and satisfactory bond in the sum of two hundred dollars ($200), to be approved by the court, to secure the costs of such appeal, should the appeal be determined against him. All applicants holding certificates of graduation from a recognized school of dentistry of the state of Indiana shall be required to pay a registration fee of two dollars ($2) before receiving a certificate to practice dentistry.

Section 3. That section fifteen (15) of the above entitled act be amended to read as follows: Section 15. The reciprocal recognition of dental certificates issued by other states shall be as follows: Any dentist who is a graduate of a recognized college of dentistry and who has practiced dentistry for at least five (5) years, shall upon presenting his certificate of graduation from dental college and his license to practice dentistry issued by some other state, shall be granted a license to practice dentistry in this state, providing that the state which issued his previous license shall have adopted similar rules in regard to persons licensed to practice dentistry in Indiana, applying for a license in that state.

TO ETCH A GOLD INLAY

After casting and cleaning in nitric and hydrochloric acids, the cavity surface of the inlay may be carefully gone over with a very thin mixture of amalgam. Allow this to remain for five or ten minutes and then boil it in nitric acid to clean off the mercury and silver. This will leave a fine surface for cement to adhere to.—*Pacific Dental Gazette.*

EDITORIAL

UNIVERSAL MILITARY TRAINING AND ITS BEARING ON DENTAL CONDITIONS OF OUR YOUNG MEN

It is almost certain that some method of universal military training for young men will be adopted. Bills to this end have already been introduced in Congress, and those in authority seem to think that it is the most feasible system of obtaining an army for self-defense since the militia and volunteer systems have proved disappointing. Not that the National Guard have failed in patriotism, but they themselves now see where it is unfair to ask a limited number of men to give up good positions and serve as federalized troops while a majority of young men of the United States, without responsibility of family or business, are allowed to escape any service whatsoever to the country.

Again, will the dental profession awaken to the opportunity afforded it if such a system be adopted?

The dental profession is continually advocating the education of the public in oral hygiene and the establishing of free dental clinics for school children. This is certainly a great movement, but, like a chain that is only as strong as its weakest link, it fails of full accomplishment due to the fact that no control is possible over the children as regards compulsory oral hygiene.

If we have universal training the profession, through its Army Dental Corps and Dental Section of the Officers' Reserve Corps, have a golden opportunity to place itself on an equality with other professions, if they and their friends insist to Congress that a sufficient number of dental surgeons, with the same grades as the medical corps, and a head to same, be created. We have now, under the present regime, one dental surgeon in the army to about 1,250 soldiers, when we should have one to every 500 soldiers to render efficient service. The present army dental corps is inadequate to care for the teeth of the soldiers. Lieutenant Puffer, who has been on "the border," states in a communication elsewhere in this issue of The Summary, that an examination of 3,800 soldiers showed 94¾% of the men to be in need of dental service.

Without proportionate increase in army and navy dental surgeons, how could they thoroughly serve an army of from several hundred thousand to several million men? If the universal training bill be enacted, it is estimated that 500,000 physically fit young men will come into training each year. Think of the results of this and how it will affect the profession throughout the country.

The profession will have a body of men, army and navy dental corps, constantly instructing the youths of the country what efficient dental service will mean to them. This dental service will be obligatory and carried out as part of the military efficiency required of a soldier.

And this will cost the profession nothing except the necessary interest and team work in backing up the National Dental Association in obtaining from Congress proper recognition and a sufficient number of dental surgeons to handle the situation.

Under the present conditions in the army and navy, a large number of soldiers are being discharged each year with a better appreciation of adequate dental service, the majority of whom never had dental care before joining the army. *These men are all new patients for the civil dentist* and would probably never have gone to a dentist except to have a tooth extracted if they had not been required to go to the army and navy dental surgeon.

Under universal training, think of the vast number that will each year be turned over to the civil dentists after compulsory training has been finished and the necessity for the care of the teeth has been impressed upon them by the army and navy dentists. If this is brought about it looks as though there would not be enough dentists in civil life to fill the demand for proper service.

The Army and Navy Register (Washington, D.C.), of January 13, 1917, states: "Unanimous indorsement of universal military training and service was given in a resolution adopted here on Saturday by more than a hundred faculty heads of medical schools and colleges throughout the country, assembled at the call of the Council of National Defense, to discuss preparedness measures as affecting the medical profession. The doctors in their resolution agreed that universal training would be in the interest of *health, development and efficiency of the youths of the country*, and urged that when universal service legislation is enacted by Congress, adequate provision be made for the training of medical officers and others connected with relief work for the army and navy."

Why do not the heads of our great American dental colleges and the profession at large send similar resolutions to Congress in view of the fact that compulsory dental service would mean so much to the health of the youths of our country?

We hope that the dental profession will awaken to its duty in these matters and take action.

A PATIENT'S COMFORT

To prevent the saliva from following the ejection tube over the lip, down the chin and maybe still farther, thus annoying the patient, punch a hole through the rubber dam at a suitable location and pass the tube through the small opening after the dam has been placed in position.—*Someone, Pacific Dental Gazette.*

SUGGESTIONS

Conducted by F. R. Chapman, M.S., D.D.S., Comumbus, Ohio

(To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Bldg., Columbus, Ohio.)

Suggestions on Inlay Casting

The usual method of cleansing an inlay pattern and preparing it for investing seems to be to go over it with a small brush or pledget of cotton saturated with alcohol. A more efficacious and otherwise preferable method is to wash it in a tube partly filled with alcohol. Test tubes may be used, but tubes in which gold cylinders are supplied are perferable.

One or more holes slightly smaller than the sprue to be used should be drilled in the cork. With the pattern securely fixed, wire is grasped with a pair of pincers, and the end is forced into one of the holes in the cork; insert the cork and shake the tube a few times. Cleansing is perfect, and there will be no trouble in getting the investment to adhere perfectly. Should it not be desirable to invest immediately, simply leave it in place until wanted. Some inlay waxes are found to be affected by alcohol—of course, this should be kept in mind.

A frequent cause of irregularities in the surface of inlays is due to an excess of alcohol being left on the pattern when the investment is made.

Alcohol affects materially the setting of plaster, so the model should preferably be dry. For applying the investment, use a brush moistened with water, but have no surplus in the brush.

A word as to sprue wire. I have seen used graphophone needles, iron and brass wire, shanks of burs, nails, etc. A dime's worth of brass pins from the stationer will last a year, and are ideal. At least two sizes should be used. Remember that if a sprue too large be used with any considerable mass of gold, there is a tendency for some of the semi-fluid metal to be forced downward by its own weight before the operator is ready to cast. To avoid this use a smaller sprue, and more than one if necessary.

For compound approximal cavities, bend a long pin into a V shape, insert both ends into the model while in the cavity, remove, and invest. To remove the sprue from the investment, cut diagonally through one side of the sprue, and removal is as easy as when a single sprue is used.

—*S. Preston, Cosmos.*

To Intensify Heat or Blowpipe

The heat of a gasoline blowpipe may be intensified by adding a small amount of ether to the gasoline.—*C. E. Fellman, Gold Nuggets.*

Gold Inlays set with Synthetic

All gold inlays should be cemented with synthetic cement of proper shade to correspond to the natural tooth. If there should be a flaw or misfit in the inlay the silicate cement remedies this and will not wash out as does oxy-phosphate cement.—*Burton Lee Thorpe, Dental Register.*

Fixed bridge work is fundamentally an iniquity, because it does not conform to the fundamental demand of nature. It has no natural prototype. In all the hundreds of thousands of years during which the creative principle has been at work in this world, it has never created a human being whose natural teeth were normally united into one fixed mass. Whenever two or more natural teeth, because of some untoward interruption in normal growth and development, were fused into one mass, it became only a question of time as to when the human economy would demand its removal in an unmistakable way.—*H. E. S. Chayes, Dental Review.*

Vaccines in Pyorrhea

Summarizing briefly the question as to the value of vaccines in pyorrhea, it may be said: First, that pyorrhea is not caused by a specific organism or group of organisms. Second, that vaccines of themselves neither cure or permanently improve pyorrhea. Third, that cases which have not yielded to surgical treatment cannot then be cured by the supplemental use of vaccines. Fourth, that there is no trustworthy evidence that the combined surgical and vaccine treatment of pyorrhea expedites or increases the percentage of cures. Fifth, that a far more simple, effective and expeditious form of treatment is in use by which any curable case of pyorrhea can be cured without resort to other treatment. Sixth, that in the metastatic infections of pyorrhea, cultures taken from the pyorrheal focus may be of value in treating the secondary infection.

—*A. H. Merritt, Journal Allied Dental Societies.*

Which are You?

No man ever becomes bigger than his profession and no profession can become stronger than the organization which makes it. The dental society is the backbone of the dental profession; are you a vertebræ of the profession or a piece of excess fat?—*Editorial, Michigan Dental Journal.*

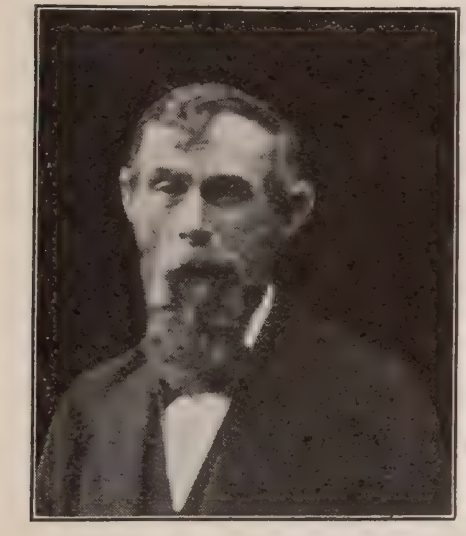
Sterilizing Canal Points

Fine canal points placed on a cement slab and sprayed with sulphuric ether with an ordinary atomizer will be sterilized and stiffened.

—*F. A. W., Dental Review.*

OBITUARY

Dr. Corydon Palmer—1820-1917



Ever yours
Corydon Palmer

I AM SURE I cannot do justice to the memory of my dear old friend, Dr. Palmer, in this short article, but I will tell a few things I know, as it would take a volume to record all the good things I know about him.

Dr. Corydon Spencer (Spencer was his mother's name) Palmer was of English descent and was born in Vernon, Ohio, 1820, and "went away" (as he called dying) at the home of his son, Dr. Delos Palmer, 48 West 50th street, New York, February 10, 1917, and his remains were interred at his old home in Warren, Ohio, in Oakwood cemetery, the Rev. J. C. Smith officiating.

He was known as Corydon Palmer, and I never saw his name written otherwise, except in an album I have, which contains the autographs of very many celebrated dentists. I have a letter which he wrote from Warren to Dr. C. R. Butler, his life-long friend and co-worker, in 1910, in which he says: "I am very poorly and mostly confined to the house, but I thank you for the invitation to come to the dental society, but do not know when I shall ever be in Cleveland again."

The last letter I received from him was dated New York, 1914, in which he says: "I cannot go out of the house, and am obliged to lie down most of the time. I feel badly that I had to leave my dear old home in Warren and I do not know what will become of my things."

He attended public school and was noted as a good student. After leaving school he learned the trade of jeweler, which was of great service to him when he took up dentistry, partly because partial and full dentures were made on gold or silver and he had already become an expert in manipulating these metals. Also, jewelers made some of their steel tools, and thus he began his work in steel, and became such an expert in making out of steel anything and everything he wanted to use in dentistry. He may have had some equals, but no superiors. A genius has been defined as one who has one part genius and ninety-nine parts hard work, but from my personal acquaintance with him—which extends over my whole professional life—I should say he had fifty parts genius and fifty parts hard work, for nobody ever tried harder to elevate dentistry. The major part of his endeavors were in a mechanical line, making improvements in instruments, artificial dentures, rubber-dam punches, wedge cutters, pliers; the last three named have never been equalled for utility and beauty of form. Do not forget that he made these working patterns from the raw steel at his own forge. He made the finest, largest and most complete set of instruments ever produced for filling teeth with cohesive gold foil, and they were used as patterns by S. S. White, who manufactured duplicates for sale, the set (including the Morrocco case) sold for one hundred and twenty dollars. He often restored nearly the whole crown of a tooth with cohesive gold foil in the manipulation of which he has never been excelled, and he took special delight in showing others his methods, and thus he had many followers. I have a plugger which he used in 1839 for filling with gold or tin foil. He also lined cavities with gold and filled the remainder with tin (Abbey's) foil. I have seen his tin fillings which lasted for thirty years.

E. E. Smith, who had been a student of John and William Birkey, in Philadelphia, came to Warren in 1839, and it was from him that Dr. Palmer gained his first knowledge of dentistry, and he finally became one of the most famous dentists in the world, and his methods and appliances were quoted and used by thousands, and his dental record will never be forgotten.

The Corydon Palmer Dental Association of Northeastern Ohio was named for him. For years he was at S. S. White's factory as an advisory expert; he was a special clinician at the Baltimore college, where there is a fine collection of his work in oil, illustrating prosthetics. He was a member of the old American Dental Convention, American (now National) Dental Association, Ohio State Dental Society, Northern Ohio Dental Association, Mississippi Valley Dental Association, honorary member of several other dental societies; one of the founders of the Forest City Society of Dental Surgeons in Cleveland, in 1868. At this time he said: "For convenience in describing teeth or operations on them, I divide the mouth (teeth) beginning at the mesial line, into right and left superior (upper) and right and left inferior (lower) sections; the teeth are to be numbered from one to eight inclusive in each section and accompanied with a set of characters specifying what kind of an operation had been made and its location in the tooth"

On behalf of this society he appeared before the American Association and exhibited and explained his beautiful models of natural teeth, in regard to which special mention is made in the report of that association. He taught operative dentistry in the Ohio College of Dental Surgery for a time, and here the honorary title of D.D.S. was conferred upon him.

According to my data he practiced over seventy years. About thirty years ago he went to New York and remained for a few years, then returned to Warren. About three years ago he again went to New York, where he resided with his son until his decease. His wife and daughters, Annie and Belle, and son, Eugene, who was a dentist in New York, preceded him in death. His old home on Washington avenue, Warren, has been closed since he left for New York the last time.

The first time he ever used a rubber dam was in Warren, when I took a piece and put it on a molar in the mouth of Dr. C. R. Butler, and we filled the tooth—I say "we" because I did the malleting. It was a large mesio-occlusal filling, and it was in place, showing no signs of caries, in 1914, after forty-five years of use. He made his own rubber dam clamps, and they were of multitudinous forms, because he would have one that just fitted the case in hand. I have several that he made for me, besides a set of fillers for the anterior teeth. He never patented any of his numerous and useful inventions, but gave them freely to the profession.

There is a picture of him in the History of Dental Surgery, Thorpe, Vol. II, published by the National Art Publishing Co., Chicago, 1909.

He was an honest man, of a retiring disposition, but very active in professional life, ever ready to impart his professional knowledge. We say, all honor to him who was a pioneer and whose accomplishments will not be forgotten while memory lasts.

By one of his admirers, HENRY L. AMBLER.

Gordon White, D. D. S.

DIED after a brief illness at his home in Nashville, Tenn., on December 26, 1916, Gordon White, D.D.S., aged 59. Dr. Gordon White was born in Pulaski, Tenn., January 3, 1857. His father was Dr. Thomas Cathy White, and his mother Nitia Gordon White. His ancestors on both the father's and mother's side were people of sterling worth, and noted for their patriotism and bravery. His paternal grandparents were conspicuous for bravery in the wars of our country from the Revolution down to the close of the Confederacy. His progenitors were residents of the states of Virginia, the Carolinas, Kentucky and Tennessee, and were for the most part engaged in the usual pursuits of southern planters. His father, Dr. Thomas Cathy White, whilst a busy practitioner of medicine and surgery, also owned and operated a large farm near Pulaski, Tenn., where Gordon White was reared. Dr. Thomas C. White had always appreciated the value of dental science for the alleviation of many human ills, and being much called upon to relieve the dental ailments of his patients, scattered over a wide rural and suburban district, became expert in exodontia and the treatments of oral disorders. He had forceps made by the firm of F. Arnold & Sons, of Baltimore, from patterns which he carved in wood, and with these he was notedly expert in the operation of extracting teeth. This work so impressed him with the value of dentistry and the need for special training in this profession, that he resolved when Gordon was but a lad to make a dentist of him, and to so direct his early training as to fit him to take a high place in this profession, which he so much admired. Dr. Thomas White did not live to see all of his plans for Gordon's training carried out, but died when the lad was eleven years old, leaving him to be his mother's chief dependence in carrying on the affairs of the farm, and at the same time to be her pride, her joy and her hope.

Gordon was educated at the Giles Military college, Pulaski, Tenn., where he was a good student, but his father's death came just at the close of the Civil War, when throughout the south the people saw most all their possessions—save their lands—swept away. He was compelled to lend his own services to conducting the farm. Therefore, his vacations were busy seasons for farm work. His profession having been chosen for him by his father, and Mrs. White being anxious to carry out the father's plans, his professional training was commenced in the office, and under the direction of Dr. J. P. Grant, of Pulaski. At the same time he was reading medicine under Dr. W. E. Wilson. After one year of this preparatory instruction, he entered the Baltimore College of Dental Surgery at the age of 19, from which institution he graduated in 1879. In the last year of his pupilage he met and favorably impressed Dr. L. G. Noel, of Nashville, during a visit to the college, and Dr. Noel, desiring the aid of a young assistant in his practice, after the favorable report of the faculty and of Dr. Grant, of Pulaski, proposed to Dr. White a connection with him at Nashville, which Dr. White accepted. This arrangement lasted three or four years, when Dr. White opened an office of his own, where he conducted a busy and successful practice until his death. Dr. White greatly loved his profession, and was ever a reader of its literature. He early connected himself with its organizations, in which he was a tireless worker up to the time of his death, and in which societies he held many offices of honor, showing the high esteem in which he was held by his confreres, not only in America, but abroad. He was president of the Tennessee State Dental Association in 1892; he was elected honorary member of the American Dental Society of Europe in 1896; he was appointed a member of a delegation of three to the International Dental Congress at Paris in 1900; in 1902 at Stockholm he was made a member of a delegation of nine to represent the International Dental Federation at the International Dental Congress in St. Louis in 1904; he was one of the honorary presidents of that Congress; he held membership in the Tennessee State Dental Association, the American Medical Association, and was honorary member of many associations throughout the country.

Dr. White was not a prolific writer, but in the course of his society work he contributed a number of papers, of which may be mentioned the following: Several papers on pyorrhea alveolaris, several papers on orthodontia, several papers on crown and bridge work, and one paper on professional ethics.

He was the inventor of several small instruments for use in his profession, on which he placed no patents.

Dr. White was a very skillful operator, and was by his professional friends regarded as one of the most superior gold workers in this country. He worked much non-cohesive gold in the foundations of his large restorations. During the latter years of his practice, he gave much of his time to the treatment of gingival and alveolar diseases, in which he was justly celebrated, because of his extraordinary success.

Dr. White was a genial companion, possessing a keen sense of humor, and this, together with his quick sympathy and genuine kindness of heart, endeared him to all who enjoyed his acquaintance, making lasting friends of his patients.

He had a high estimate of the value of dental service when thoroughly and skillfully executed, and from those he thought able to pay, he exacted high fees for his work. He urged upon his professional friends the high standard he set for himself, and was ever a leader and uplifter amid his fellow workers.

Dr. White never married, and not being anchored by the ties of a family, he indulged his love of travel, making many trips to Europe and distant lands. He was a student and patron of art, and possessed many valuable original paintings. His visits to the great art centers of the old world gave him exceptional opportunities for the study of the fine arts, and he endeavored to inculcate a love for these in his home city, being a leading spirit and active worker in the Nashville Art Association. He was also fond of books and possessed a fine library.

Dr. White's death leaves a vacancy in the ranks of his profession, and in the social circle that he frequented, which will long be felt by those who knew and loved him.

IN MEMORIAM RESOLUTIONS

Dr. Gordon White

Whereas, Almighty God in His infinite wisdom has seen fit to remove from the scene of his earthly labors our esteemed colleague, Dr. Gordon White; and,

Whereas, The Nashville Society of Dental Surgeons, of which he was an honorary member, recognizing his great worth as a contributor to the scientific work of his profession, desires to record its appreciation of him as a man, and its sense of sorrow at his death; therefore,

That the members of this association extend to the family of the deceased their sincere sympathy in their bereavement, and that this resolution be spread upon the minutes of the Nashville Society of Dental Surgeons, and that it be forwarded to the dental journals for publication.

STANLEY RICH,
W. G. HUTCHINSON,
Committee.

Dr. Albert B. Crawford

Dr. Albert B. Crawford, one of the most prominent citizens of Edgar, Wis., died January 22, 1917, after a brief illness.

He was born at Crawford's Hill, near Mayville, Wis., on July 27, 1849. He attended school in that vicinity, afterward going to the Albion Academy and to Ripon College. He studied dentistry at the University of Pennsylvania, and received his diploma from that institution. He returned to Wisconsin in 1882, and after spending six months at Juneau and five years at Horicon, moved to Grand Rapids in 1887. He moved to Marshfield in 1906, and after the death of his wife, to Edgar in 1907.

He has always taken a great interest in his profession, and at the time of his death was vice-president of the Central Wisconsin Dental Society.

HEALTH OF RURAL SCHOOL CHILDREN

A recent investigation made by the U. S. Public Health Service in connection with studies of rural school children showed that 49.3% had defective teeth; 21.1% had two or more teeth missing, and only 16.9% ever had dental attention. Over 14% never used a tooth brush; 58.2% used one occasionally and only 27.4% used one daily. Defective teeth reduce physical efficiency. Dirty, suppurating, snaggle-toothed mouths are responsible for many cases of heart disease, rheumatism and other chronic affections. The children are not responsible for the neglected state of their teeth. The ignorant and careless parent is to blame for this condition—a condition which hampers mental and physical growth and puts a permanent handicap on our future citizens. School teachers can and are doing much in inculcating habits of personal cleanliness on the rural school child, but this will fail of the highest accomplishment unless parents co-operate heartily and continuously. This is a duty which we owe our children.—*American Journal of Public Health,* November, 1916.

SOCIETY·ANNOUNCEMENTS

Indiana State

The next meeting of the Indiana State Dental Association will be held at Indianapolis, May 15, 16, 17. For further information address,

A. R. Ross, *Secy.*, Lafayette, Ind.

Michigan State

The Michigan State Dental Society will hold its annual meeting at Detroit, April 12, 13, 14.

Kentucky State

The next annual meeting of the Kentucky State Dental Association will be held at Lousiville the three days previous to the Kentucky Derby—May 9, 10, 11, 1917. Address all correspondence to Dr. W. M. Randall, Louisville, Ky.

W. M. Randall, *Secy.*

Illinois State

The fifty-third annual meeting of the Illinois State Dental Society will be held in Quincy, Ill., May 8, 9, 10, 11, 1917.

Henry L. Whipple, *Pres.*, Quincy, Ill.
J. P. Luthringer, *Sec.*

Missouri State

The fifty-second annual meeting of the Missouri State Dental Association will be held at St. Joseph, April 4, 5, 6, 1917. Members of the Missouri State, National Dental Association and all members of state societies are extended a cordial invitation.

J. G. Leftwich, *Sec.*

Pennsylvania State Board

The next examination of the Pennsylvania Board of Dental Examiners will be held in Musical Fund Hall, 808 Locust street, Philadelphia, and the College of Pharmacy Building, Pittsburgh, on Wednesday, Thursday, Friday and Saturday, June 13th, 14th, 15th and 16th, 1917. The examination in operative dentistry will be held on Wednesday, June 13th, at 8:30 o'clock, in the Evans Dental Institute, 40th and Spruce street, Philadelphia, and the University of Pittsburgh Dental Building, Pittsburgh. The examination in prosthetic dentistry will be held on Wednesday at 1:30. Application papers can be secured from the Department of Public Instruction, Harrisburg. For further information address the secretary, Alexander H. Reynolds, 4630 Chester Ave., Philadelphia.

NATIONAL DENTAL ASSOCIATION ANNOUNCEMENTS

The National Dental Association will meet in New York City, October 22d, 23rd, 24th, 25th and 26th. The headquarters will be at the Hotel Astor, situated on Broadway at 44th and 45th streets. This hotel has the largest ball room in the world, and this room will be used for all the general assembly meetings. Other large ball rooms will accommodate the Sections, House of Delegates, etc. The exhibits will be shown in the beautiful roof gardens. Thus practically all of the meetings will occur under the roof of this spacious hotel.

Full accounts of the plans of what promises to be the largest and greatest meeting in the history of the association will be published later. Suffice it for the present to state that the slogan for this year will be "Quality rather than Quantity." Nevertheless, there will be quantity also. But the important announcement at this time must be the warning, *reserve your rooms at once.* Make reservations by mail direct to the hotel of your choice. This may seem premature considering the abundance and variety of hotel accommodations here, but New York hotels are always crowded. Nearly seven hundred conventions met here during 1916. October is one of the busiest months. If you desire to get into any particular hotel, therefore, it will be safest to write at once. For example, 150 rooms have been reserved at the Headquarters Hotel, The Astor, already.

HOTEL ASTOR, TIMES SQUARE, 1000 ROOMS

GENERAL AND REGISTRATION HEADQUARTERS

Single with bath	$ 4.00	$ 5.00	$ 6.00
Double with bath	5.00	6.00	7.00
Two connecting rooms with bath (3 persons)	9.00	10.00	11.00
Two connecting rooms with bath (4 persons)	10.00	11.00	12.00

☞ Rates at other hotels vary from $1.50 without bath to $4.00 with bath.

A copy of the list of hotels and rates in pamphlet form will be sent to any member of the National Dental Association on application. Please inclose stamp.

R. OTTOLENGUI,
Chairman Publicity Committee.

80 West 40th Street, New York City.

South Dakota State

The thirty-fifth annual meeting of the South Dakota State Dental Society will be held at Sioux Falls, April 26th and 27th.

ERNEST W. ELMEN, *Secy.*,
Sioux Falls, S. Dak.

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXVII — APRIL, 1917 — No. 4

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The Indiana State Dental Society	The Northern Indiana Dental Association
The Kentucky State Dental Society	The Eastern Indiana Dental Society
The Louisiana State Dental Society	The Southwestern Michigan Dental Society
The West Virginia State Dental Society	Odontological Society of Western Pennsylvania
	The Lake Erie Dental Society

and Several Local Dental Societies

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L. P. Bethel, M.D., D.D.S., Editor-in-Chief

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Neither the editor nor publisher is responsible for the views expressed by authors in the reading matter published by THE DENTAL SUMMARY

REGULAR CONTRIBUTIONS

ANKYLOSIS OF THE JAWS*

BY CHALMERS J. LYONS, D.D.SC., ANN ABROR, MICH.

IN HIS WORK on orthroplastics of the temporomandibular articulation, Murphy classified the ankylosis which occurs in and about the temporomandibular articulation under four heads: (1) intra-articular bony ankylosis; (2) intra-articular fibrous ankylosis; (3) subzygomatic cicatrical fixations, and (4) intra-alveolar buccal fixations.

The only part of this subject which I shall consider at this time is the first division of Murphy's classification, intra-articular bony ankylosis, or true ankylosis. While this affection is not rare, there have been comparatively few actual cases with results reported, and the work done along this line, and reported in medical or dental literature, is by no means extensive.

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*Read before the Section on Stomatology (A. M. A.), of which THE DENTAL SUMMARY is the representative organ for the dental profession by special arrangement with the Jour. Amer. Med. Assoc.

For the purpose of clearer statement, let us review briefly the temporomandibular joint. Owing to the character and location of this joint, it is particularly susceptible to traumatism and infection. When the complex mechanism and environment of this joint is considered, it can readily be seen that an injury, or an infection in it, or a combination of the two, is far from being amenable to normal repair.[1] In the temporomandibular articulation, the socket is formed partly by the mandibular fossa and partly by the articular eminence, and over the latter an approximately congruent surface for the head of the condyle is formed by the articular disk. The two temporomandibular articulations act simultaneously. When the mouth is opened, the head of the condyle with the inter-articular disk glides forward on the articular eminence, and when the mouth is closed, it slips back into the mandibular fossa. The opening and closing of the mouth are consequently attended by a sliding of the mandible (a gliding joint). In addition to this modified form of hinge movement, the articulation possesses a second kind of motion, viz., the lateral displacement of the mandible in reference to the skull. In this movement, one condyloid head remains in the mandibular fossa, and rotates or pivots on a center, while the other advances on the articular eminence, a movement which is impossible when the mouth is opened to its greatest extent. Both the hinge and lateral movements are combined in the act of mastication. Thus an injury or an infection involving this joint is much more complex than the same lesion would be involving a joint less intricate, and the process of repair is consequently much more complicated.

ETIOLOGY

What causes intra-articular bony ankylosis of the jaw? The two sexes are about equally affected, and this seems to be an affection into which sex selection has no controlling influence.

It has been my own observation, as well as that of others, that the predisposing age is from one to ten years, that is, that the largest percentage of patients who come under our observation present a history of injury of infection in the early ages. Orlow found that ankylosis was established in eighty per cent. of his patients between the ages of one and ten years. Blair states that "the age at which ankylosis became established varied considerably, but in the great majority of cases, when the age was given, it was under ten years." The primary causes for ostearthritis, or bony ankylosis, seem to be traumatism and infection. There seems to be some diversity of opinion as to which of these etiologic factors should be assigned first place. Orlow states that in about thirty per cent. of his cases, injury to the joint was the cause of bony ankylosis. Blair asserts that "by far the most common single cause was trauma, this accounting for nearly fifty per cent. of all cases. The great majority of these injuries were not open wounds, and by far the most common form of injury was a blow, or a fall on the chin."

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[1] Sobotta and McMurrich: Human Anatomy, W. B. Saunders Company.

Others believe that infection is the greatest etiologic factor in the affection, and some believe that in every case of trauma which seems to cause ankylosis, infection is a secondary factor of no mean importance.

My own observation has been that trauma has been at least the primary cause in by far the largest number of cases presented in our clinic. Authentic statistics in this regard cannot be procured readily, owing to the fact that the large majority of these patients are not seen until long after the condition is established. Sometimes several years elapse before surgical interference is resorted to, so that a complete history in such cases is not wholly reliable. The diseases which play a part in causing ankylosis of the jaws are scarlet fever, otitis media, dento-alveolar abscesses, diphtheria and gonorrhea. It may also result from a metastasis, from foci of infection within the mouth, or elsewhere in the body. The presence of the beginning of ankylosis of the mandible during childhood appears logical when we consider that accidents and many of the infectious diseases to which it is due are more prevalent during the early period of life. The onset and development of ankylosis of the jaws is very insidious and slow, several years often being occupied in the production of lesions of any considerable extent. Usually the patients complain more of the disability which is caused by the affection than of any physical discomfort which it occasions. The general health of patients who are afflicted is usually little impaired. Digestive troubles seem to be the principal factors outside of the joint lesion, owing, undoubtedly, to the impaired function of mastication.

PATHOLOGY

In case of violent injury to the joint, ankylosis is usually brought about by the proliferation of fibrous tissue into or around the region of injury.

Should the articular cartilages be preserved in whole or in part, they sometimes undergo direct metaplasia into fibrous tissue or fibrocartilage, or into mucinous tissue, which gradually becomes fibrous. In many of these cases the fibrous tissue is trifling in amount, and the ankylosis is produced mainly by cartilage and bone. In some cases the ankylosis is due to cartilage and bone intermingled. Immediately following a dislocation or intracapsular fracture, or a contused wound to the joint, there is more or less abundant hemorrhage into the joint. Later, inflammation sets in. The capsule and surrounding parts become swollen and edematous, infiltrated with inflammatory products. There is an effusion into the synovial cavity. Portions of the coagulum may persist and become organized, forming osseous tissue in the joint. When an infection is the predominating etiologic factor, there is produced a synovitis with effusions into the joint cavity. These infections may be purulent, and chronic synovitis results. The joint synovium becomes thickened in the early stages, while the surface of the cartilage is rough and fibrillated. Marked inflammatory changes are induced in the subcartilaginous marrow spaces and the cartilage is destroyed. Milen believes that the degeneration of the cartilage is due to some interference with nutrition, or is produced by the extension of the exudate which destroys the cartilage. Adami[2] states that the resorption of the cartilage is brought about by the subchondral medullary substance. In the early stages not all of the cartilage may be destroyed, but there may remain islets of cartilage throughout the articulating surfaces. These islets may in time be converted into bone.

Thus the cartilages are gradually transformed into a vascular fibrous or fibro-osseous tissue. The joint cavity is traversed by dense fibrous bands, and is converted into a number of small spaces, bounded by dense fibrous tissue, and containing synovial fluid. In the advanced stages, the whole of the articular cartilages may disappear and be replaced by fibrous tissue, so that the original structure of the joint becomes well nigh unrecognizable. Secondarily, changes take place in the newly-formed fibrous tissue, and in time it is converted into a mass of spongy bone, and complete osseous ankylosis results. It seems to be a characteristic phenomenon of cartilage that it is more or less interchangeable with fibrous tissue in the joints. It has been observed that when a joint cartilage is becoming atrophied, it becomes calcified, or transformed into a fibrillated structure, closely resembling fibrous tissue, while perichondrial fibrous tissue commonly becomes changed into typical hyaline cartilage. The deeper layers of the cartilage may also proliferate, forming nodules of hyaline cartilage or bone.

The greatest metaplasia, however, is found in subcartilaginous inflammatory process, where, as a rule, there is a great tendency to the formation of cartilage and bone. Thus, in an inflammatory condition of the temporo-mandibular articulation, either by traumatism or by infection, there is a marked susceptibility to metaplasia, with the result that the normal structure finally may become obliterated and a new structure results.

CHARACTERISTICS OF THE DISEASE

On account of this disease occurring in the joint, and having its incipiency in early childhood during the period of growth, the normal development of the mandible is considerably interfered with, so much so that it is marked by a conspicuous facial deformity. This deformity is characterized by perceptible recession of the chin. This may be due to the action of the geniohyoglossus muscles in their constant efforts to open the jaws. There is also a general atrophy from disuse of all the tissues of the lower jaw, including the mentalis and quadratus labii inferioris muscles. The deformity may be so exaggerated as almost entirely to obliterate the chin. Usually when the ankylosis has been established on one side in early childhood by trauma, and the disease has slowly progressed until the normal structure of the joint has become obliterated and the jaws closed, the opposite side also will be more or less affected on account of the disuse of the joint.

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[2] Adami: General Pathology, Philadelphia, Lea & Febiger.

DIAGNOSIS AND TREATMENT

The differential diagnosis in the character of the ankylosis is not a complex problem. In fibrous ankylosis, even though the adhesion is quite firm, there will be some movement, especially lateral movement in the jaws. In bony ankylosis, the only movement which can be observed is the very limited movement of the elasticity of the structures involved. There can be no lateral movement in the lower jaw in intra-articular bony ankylosis.

The treatment in intra-articular bony ankylosis consists in surgical measures. Forced separation of the jaws will avail nothing. The surgical procedure consists in establishing pseudarthrosis, either in the site of the true joint or below it. Esmarch, in 1855, suggested an operation for intra-articular bony ankylosis by the removal of a wedge-shaped section of bone, with base downward, three-quarters inch long, from the horizontal portion of the mandible. This did not prove satisfactory on account of the disturbance of the normal action of the masticatory muscles which followed. Kœnig, in 1878, introduced the operation of resection of the mandibular head. The results were unsatisfactory on account of the possibility of a recurrence.

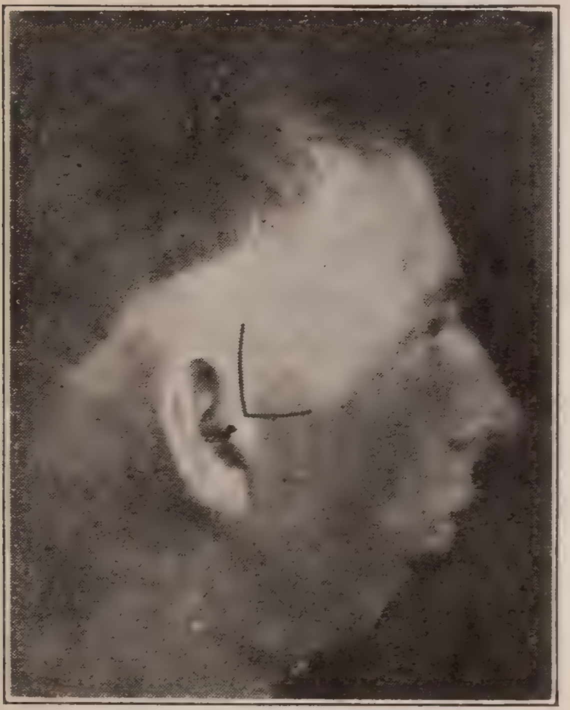

Fig. 1.—Course of the incision.

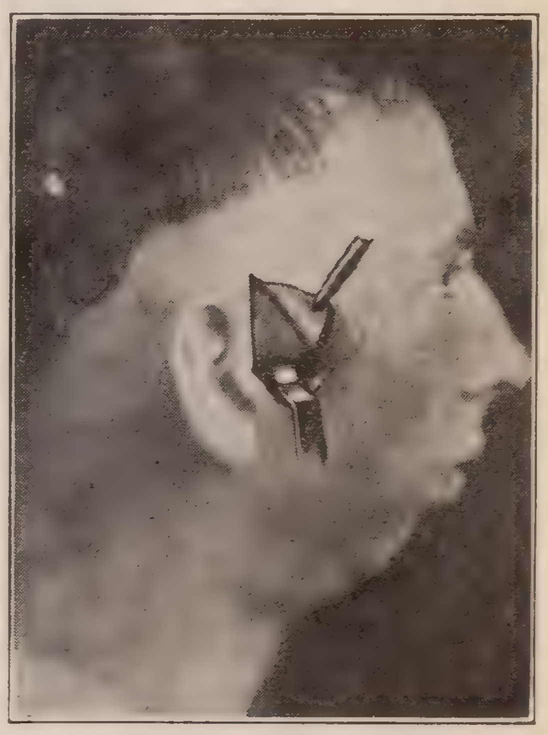

Fig. 2.—Exposure of the joint.

Brophy[3] states that he has obtained very satisfactory results by removing a crescent-shaped section of bone from the region of the angle of the jaw. He places gutta percha between the ends of the bones, which prevents the freshened ends of the bones from uniting. The gutta percha is allowed to remain for a period of six weeks, after which the wound is reopened and is removed. During this time, it is asserted that a well-organized membrane is formed which seems to form the intra-articular tissue.

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[3] Brophy· Oral Surgery, the Diseases, Injuries and Malformations of the Mouth and Associated Parts, Philadelphia, P. Blakiston's Son & Co.

The operation which has been very satisfactory in my experience is the operation similar to the one reported by Lilienthal,[4] in which a section of bone is removed from the condyle.

TECHNIC OF THE OPERATION

Beginning about 5 mm. in front of the tragus of the ear, a horizontal incision is made through the epidermis and superficial fascia along the lower border of the zygoma, extending anteriorly for a distance of about 3 cm. A vertical incision is then made through the epidermis and superficial fascia, extending upward from the point of beginning about 4 cm., running just in front of, and parallel to the ear (*Fig.* 1). The epidermis and superficial fascia are now dissected up to form a flap. The underlying tissues containing the branches of the seventh nerve and also the superficial vessels are pushed aside by the use of retractors and blunt dissectors until the joint and a portion of the condyle is laid bare (*Fig.* 2). Great care must here be exercised that the zygomatic and temporal rami of the facial nerve are not torn in the effort to expose the bone.

After the neck of the condyle has been cleared of the tissues by blunt dissection, a full curved aneurysm needle is used for the purpose of guiding a steel ribbon 3-1000-inch in thickness and 1 cm. in width, back under the condyloid neck (*Fig.* 3). This is for the protection of the internal maxillary artery in removing the section of the condyle. The section is removed by the use of the mastoid chisel, taking out about 1 cm. of the bone, including the periosteum. Then a flap of superficial fascia is elevated from the temporal muscle and interposed between the ends of the condyle, and sutured with catgut sutures. The wound is then closed with horsehair.

After the excision of a portion of the condyle, as indicated, has been accomplished, on one side, an attempt should be made to open the mouth. If the jaws cannot be opened, the same operation should be resorted to on the opposite side, when of course the jaws will be free. No attempts should be made to stretch the jaws or hold the mouth open until partial repair of the soft tissues has been obtained. After about the fifth day, my treatment has been to begin opening the mouth by the use of a graduated mouth gag. The patient will experience considerable pain at first, but the mouth should be opened until there is at least a space of 2 cm. between the opposing cuspid teeth. When this space is obtained, the graduations on the gag are noted and the gag placed in the same position in the mouth and opened to the same degree four or five times each day. Each time the gag is inserted, it is left in position for a period of five minutes. This treatment of stretching the jaws should be maintained for several weeks, the patient doing this himself after being properly instructed.

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[4] Lilienthal: Ann. Surg., August, 1911.

DANGERS, DISADVANTAGES AND COMPLICATIONS OF THE OPERATION

One of the greatest dangers involved in the operation is that of infection. Owing to the close proximity to the hair line, there is a greater possibility of infection either in the wound at the time of operation or subsequently than in wounds of like nature elsewhere on the skin surfaces. Therefore, the greatest precautions must be exercised that everything connected with the operation should be absolutely sterile and that extra precautions be taken in the subsequent dressings of the wound, that infection be warded off. An infection in the wound may ruin what would otherwise be a successful operation.

Necessarily after repair has taken place, there is more or less cicatricial tissue at the point of operation, which leaves a scar and sometimes more or less of a depression at the point of the false joint; but this, in my opinion, is of secondary importance. The dangers to be encountered in the operation are, first, the inability of the anesthetist to control the tongue during the administration of the anesthetic. Some cases are on record in which tracheotomy had to be resorted to during the operation. Second, danger of injury to the temporal rami of the seventh nerve, whereby paralysis of the orbicularis oculi muscles may follow. Another danger to be encountered is injury to the internal maxillary artery. This vessel lies directly in the field of operation, and must be protected in some manner in removing the segment of bone in the process of forming the new or false joint. This may be accomplished by retractors, Murphy's periosteotomes, or any other instruments which may be easily inserted between the artery and the neck of the condyle. I believe that the steel ribbon which I have described is superior in the simplicity of its application, and effectiveness, to anything which has been called to my attention.

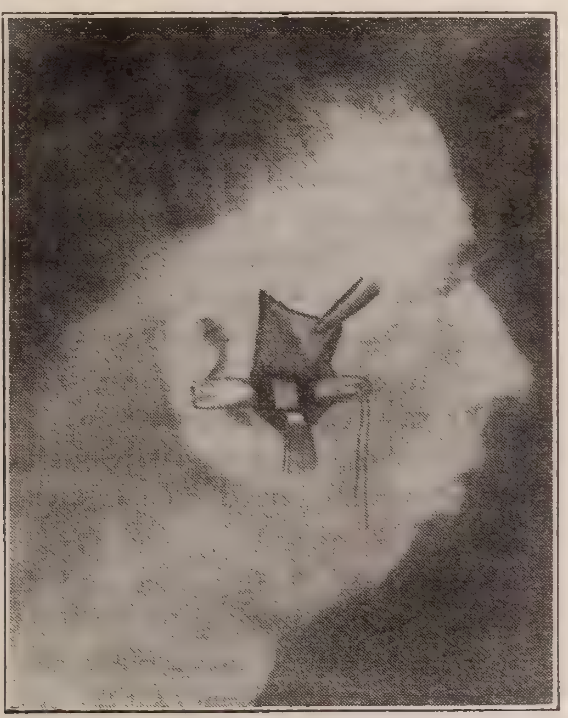
Fig. 3.—Insertion of steel ribbon.

CONCLUSION

It might be stated that, outside of the dangers enumerated, this operation is comparatively free from serious complications or sequelæ. The patient begins the mastication of his food in about ten days to two weeks following this operation. The movement of the jaws prevents the formation of too much fibrous tissue between the two ends of the bone, and after repair is completed, it will be found that the tissue which had become atrophied begins to take on a more nearly normal condition. The patient takes on weight, the general health and appearance improve, and he again resumes confidence in himself. The correction of ankylosis of the temporomandibular articulation is an operation which not only gives great satisfaction to the patient, but also is one which is very gratifying to the operator.

DISCUSSION

Dr. H. A. Potts, Chicago: These results of injuries and infections are really more common than the general practitioner seems to think. Quite frequently we see, in large clinics, patients who present the same appearance as this one. The diagnosis as to the form of ankylosis is very important, and judging from the experience of previous operators and the conditions found at operation, the operation here described is certainly of the type which is best suited to the bony ankylosis. The dissection of fibrous bands and the treatment of the various classifications, as given, would permit of other treatment, but the bony ankylosis is best treated. Dr. Lyons is to be congratulated on the result in this case, which, if the patient does his part, will avoid a further complication, or even lessening of the space already gained.

Dr. Chalmers J. Lyons, Ann Arbor, Mich.: Of course, in these cases the patients must do their part. They are instructed to keep constantly stretching the jaws. These instructions are very important. More can be accomplished by this stretching than by anything else, doing it several times a day, to keep the space already gained. This man has gained a little more space by this exercise.

Dr. Potts: If you put the index finger on the upper teeth and the thumb on the lower teeth, you can get a good deal of force in stretching.

Dr. Lyons: That is a good suggestion. These exercises must be kept up continuously. In these cases, if nothing is done, there is a great tendency for the ankylosis to recur.

SOMETHING NEW IN PLATE REPAIR

BY DR. G. B. SPEER, LOS ANGELES, CAL.

To replace a broken bicuspid, select a porcelain crown to fit the case, and with an engine bur fit a seat for the crown. Now, with a drill, make a hole running up into the rubber on the buccal position of the plate, bend the post to fit and cement in place. Most plates are thick enough for this kind of repair of all teeth, but the molars. Molars can be repaired by using the diatoric teeth, seating same as above and using small nickel-plated wood screws, which can be bought at any hardware store, as posts.

A NEW OPERATIVE PROCEDURE FACILITATING THE ADAPTATION OF ARTIFICIAL DENTURES*

BY H. A. POTTS, M.D., CHICAGO, ILL.
FELLOW OF THE AMERICAN COLLEGE OF SURGEONS, CHICAGO

AUTHORITIES on prosthetic dentistry agree that, before taking an impression, a careful and comprehensive study of the mouth from both the physiologic and the pathologic aspects should be made. In an edentulous mouth, the thickness and firmness of the soft tissues are noted, as well as stomatitis, leukoplakia and other diseased conditions, if they are present. The bony ridges are studied with regard to undue pressure which may be brought to bear on them.

If natural teeth are to be retained, they and their supporting structures must be restored to health, and in either case the attachments of muscles are noted. All of these conditions are studied in order that the denture may meet the following requirements, namely, that they may be useful, look well and be comfortable (Prothero). Primarily all of these depend on their retention which is made possible by two physical factors, adhesion, which plays the lesser role, and atmospheric pressure.

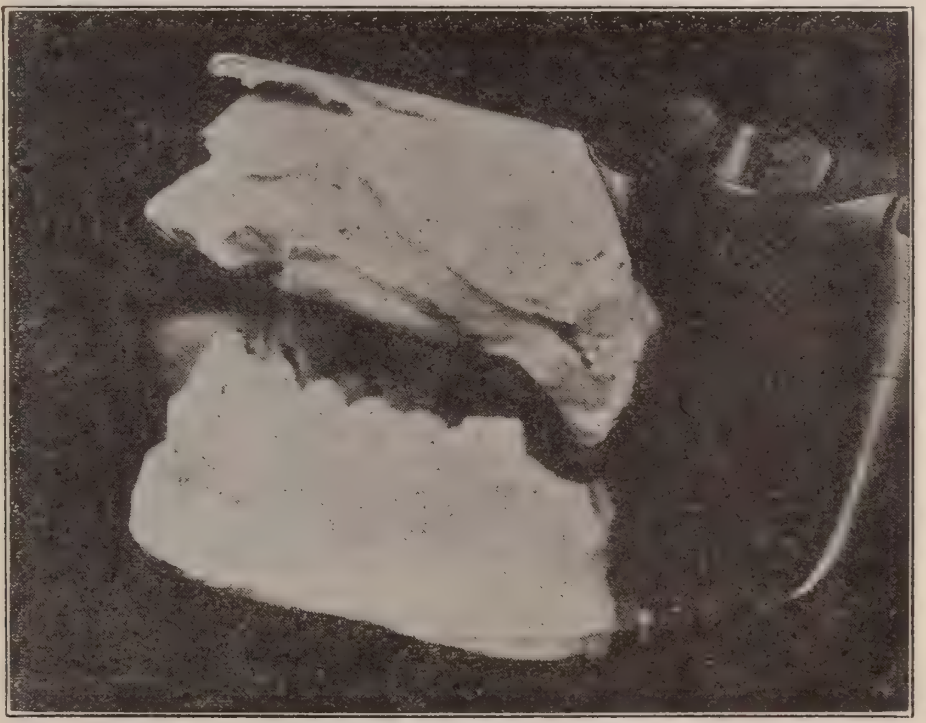

Fig. 1.—Casts of upper and lower jaws, showing their abnormal relation to each other, and marked protrusion of the upper bony arch.

On account of the varying density and compressibility of the different tissues in the same mouth, both impression and model are scraped in order that a perfect adaptation of the plate to the tissues may be maintained under all the various movements and different degrees of stress to which the plate may be subjected.

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*Read before the Section on Stomatology (A. M. A.), of which THE DENTAL SUMMARY is the representative organ for the dental profession by special arrangement with Jour. Amer. Med. Assoc.

While the foregoing applies to the normal mouth, the same adaptation, adhesion and atmospheric pressure apply to the abnormal mouth. To correct the abnormal mouth, surgical procedures are resorted to, namely, the removal of loose fibrous or spongy tissues, the cutting of fibrous bands, the excision of spicules of process, or well-defined osteoid growths which occur in the palate, labial, lingual or buccal regions of the jaws.

The removal of exposed, projecting process after extraction should be more frequently done than is our habit.

There is another quite common condition which can be remedied by surgical interference and which, so far as I can judge from a review of the literature and conversation with some of the leaders in dental thought, has not been pointed out, and that is the practical elimination of bony undercuts in the upper jaw. If this is done, the making of metal dies and the swaging of metal plates would be simplified, and the making of cores unnecessary.

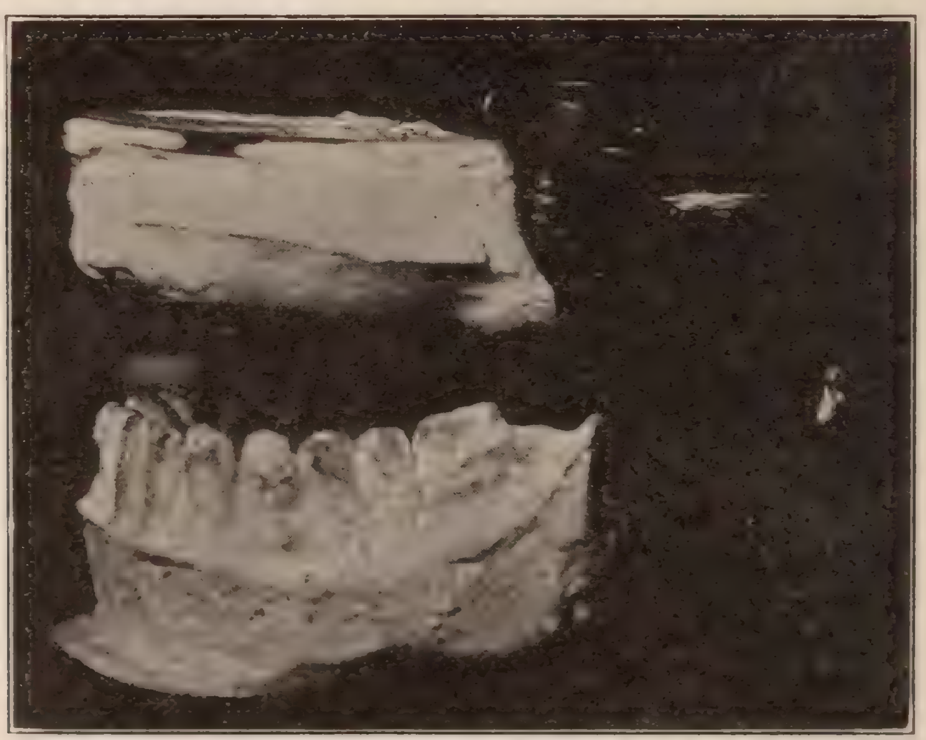


Fig. 2.—Casts of upper and lower jaws after operation, showing normal relationship.

A conformation which requires the slipping in of a plate as a shoe, does not favor retention, but rather militates against it, as the chief factor in retention is atmospheric pressure.

When such a plate, the labial and buccal borders of which are forced into undercuts at one or more places, is subjected to the forces of mastication, the upper borders are carried away from the soft tissues, and air passes beneath the plate with its consequent release.

The study of the case here reported and the excellent result obtained by surgical means on the bony process seems to justify its more frequent performance.

The patient, a woman, aged 50, had long since lost all upper teeth posterior to the cuspids, and mastication on the remaining six anterior ones, together with some destruction of peridental membrane, had resulted in a marked protrusion. Her dentist, Dr. F. H. Stafford, of Chicago, extracted the remaining teeth and proposed to make an upper denture, but found it quite impossible.

He referred her to me for surgical intervention. As can be seen by the illustrations and models, there is a very marked protrusion of the alveolar process which was covered with quite normal gum tissue and mucous membrane. (*Figs.* 1 and 3.)

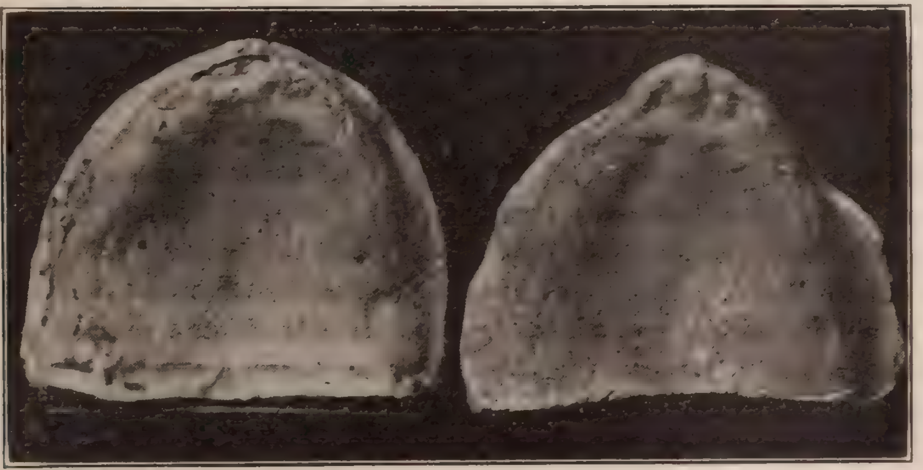


Fig 3.—Casts of upper jaw made from impressions taken before and after operation; the result is a perfect arch.

Two incisions along the alveolar ridge, extending from the second bicuspid region on the one side to the corresponding point on the other were made, which, being "quarter-moon" shaped, eliminated the gum tissue which was between the teeth and left two cleanly-cut borders of the flaps. A medium vertical incision extending from the reflection of the mucous membrane joined the other incision at right angles. The resulting flaps, together with the periosteum, were reflected.

By means of rongeur forceps and large bud-shaped burs, the outer plate of bone was removed from the first bicuspid socket on the one side to the corresponding one on the other side. The thickness of bone removed varied, in the bicuspid region being the outer plate only, but the remainder extended to the posterior walls of the alveoli.

The incision along the alveolar border as well as the vertical one was closed with interrupted horsehair sutures; there was primary union within ten days. Impressions of the new normal mouth, as seen in *Figs.* 2 and 3, were taken, and a perfectly satisfactory denture constructed.

31 North State Street.

DISCUSSION

Dr. Chalmers J. Lyons, Ann Arbor, Mich.: This is the first operation of this kind that has been called to my attention, but I can see the good that can be accomplished in a great many of these seemingly-impossible cases for the fitting of artificial dentures. Dr. Potts has practically restored this to a normal condition. This procedure should be brought to the attention of men working in prosthetic dentistry, because there is no doubt that a great number of cases come before them in which such an operation would simplify the fitting of the artificial denture.

Dr. Eugene S. Talbot, Chicago: I have removed small pieces of the alveolar process for the same purpose, but never to the extent that Dr. Potts has removed it. In a number of cases I have also dissected up the buccinator muscle, which extended down to the border of the alveolar process, cutting it clear up to the zygomatic process, in some cases a very little, in others quite extensively, but I would like to know how to prevent the tissues from growing together again. That has been the most difficult proposition I have met, especially in cutting the frenum of the lip, to keep the parts from coming together and healing over.

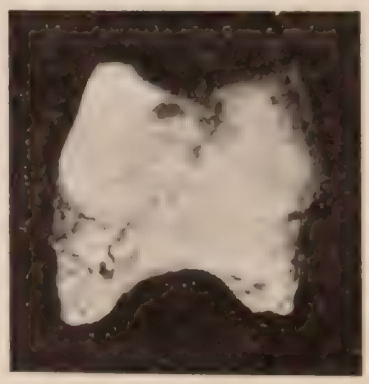
Dr. H. A. Potts, Chicago: In regard to the inquiry of Dr. Talbot, I think I can best answer that by referring to the operation for widening the pylorus of the stomach, known as the Heincke-Mikulicz operation, which involves making an incision in one direction and closing it in the other. The same principle can be applied in the case of the frenum. By carefully suturing the mucous membrane together it will make the reflection continuous, consequently there will be no raw surface to oppose the raw surface at the gum, and it cannot become attached because it is covered with mucous membrane. The operation can be varied by suturing the mucous membrane into that area of the buccinator region. I have since seen an enormous exostosis of the labial surfaces and the tuberosities which almost filled the palate. Another interesting case has been reported of an exostosis that almost filled the palate. In such a case I see no reason why an incision could not be made from one end to the other and the bone chiseled away, if necessary, removing part of the palatal, mucous membrane and periosteum, suturing that down and making a perfectly normal mouth. As I have said, many of these things have been done, but really not with the idea of facilitating the fitting of an artificial denture, and I think by paying a little closer attention and observing these cases they can be benefited very materially.

AN UNUSUAL CASE

BY C. H. WOOLGAR, D.D.S., MAGDALENA, N. M.

An unusual case recently came under my observation, and I am reporting it for the benefit of the readers of The Summary.

A lady, 60 years of age, came to the office to have an upper left second molar tooth treated. It was very loose and she supposed that it was affected with pyorrhea. Upon examination I advised extraction, and the tooth was removed. A third molar was trying to creep beneath the second molar, and had absorbed the roots of this permanent tooth as perfectly as are the roots of temporary teeth absorbed.



Enlarged to twice its size.

I am sending the extracted tooth for illustration, and would be pleased to know if others have ever had a similar experience.

PREVENTION OF AND IMMUNITY FROM DENTAL DISEASES*

BY DR. CHARLES B. BRANSON, SEATTLE, WASH.

DIETETICS IN DENTISTRY

FROM the earliest reported records of dentistry, five thousand years ago, the Egyptian's foremost thought was along the line of prevention of dental caries. From that time to the present the ideal of prevention has been uppermost in all writings throughout the ages. Today the verdict of science, after most exhaustive research, is that while much is known concerning this subject, little is understood. Miller, in the last year of his work, expressed the universal sentiment when he said, "I can see how caries occurs, but not why." Pickerill's investigation, so thorough in considering every tangible factor pertaining to the teeth, mouth and saliva, seems to have summed up all previous knowledge of dental investigations, and added much in the way of valuable suggestions as to prevention and education along the lines of the care of the teeth; but his conclusions fail to reveal the cause of immunity or how it can be produced.

Recent developments have disclosed that dental diseases are responsible for an alarming number of systemic disorders of the most serious nature, and we are aware as never before of the great responsibility that rests upon us. Dr. Mayo has stated that medicine is at a halt; that the next step in preventive medicine must be taken by the dentists. He asks, "Will they do it?" There is a call for volunteers that we cannot ignore. We must work out the solution of disease within our field, not only for the sake of the usefulness of the teeth, the comfort of the patient, but health itself is at stake. Our opportunity is thrust upon us, and the possibilities to mankind are unlimited, if a practical solution is found.

In the tangle of theories, investigation and evidence at hand, we are left in a maze of perplexity as to the course of investigation remaining to pursue. Theories have fallen before facts that have bewildered science again and again. Head, in his experimentations, found that a tooth so softened by a weak lactic acid solution that it could be cut with a knife, on immersion again in living saliva, returned to its original hardness. He said, "I cannot explain it; I am simply dumbfounded."

There is so much knowledge with so little understanding of a practical nature that it appears that the underlying principle must be lacking, for there is a solution to every worldly problem, when once the key to it is found. It seems strange that practically all scientific investigation and study along the lines of dental disease have been directed at the mouth alone as a local condition, only to be examined and treated along mechanical and medicinal man-made principles, instead of considering nature in the matter, her power to construct as well as destroy, not locally alone but systemically, at the same time. No disease can be entirely local within the limits of the body without its affecting the whole. In studying a plant, the naturalist must study the soil, its environment, nutrition, development, before he can understand its physical condition, and the reason. The government has worked out to an absolute science the balanced nutrition of plants and animals necessary to produce their maximum development, so that uniform results are assured under intelligent care and management. This has been possible only by following the laws of nature in her application of nutrition. Any living body under analysis combines the same chemical elements as its nutrition; so to build we must furnish nature with the required material. The study of disease is simple if we go to the roots first, and look to nutritional conditions for the cause. Complexity comes from studying the branches and ramifications without understanding the cause itself. Twenty years ago, Black wrote that the cause of immunity and susceptibility to dental caries would necessarily be found in conditions of the general system, influencing the qualities of the mixed fluid of the mouth by which the teeth are surrounded. Apparently little attention has been given to this statement, for investigation in this line has been lacking.

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*Read before the Seattle Dental Society.

Science, in studying the local conditions surrounding the teeth, has not seriously considered the systemic bodily influences, the state of health of the individual and his nutrition. In looking for immune bodies, they have tried to isolate life itself as a tangible thing to be seen with the eye. The life spark belongs to the living, not the dead. It eludes the reagents of the chemist, the microscope cannot see it, nor the X-ray penetrate it, and in the attempt to isolate it in concrete form, failure has been their reward, for science has never yet been able to explain life, which is the one close secret of nature in which we may not share. Like electricity, we may see its activities, its manifestations, its phenomena, its source and application of power, but not see it in tangible form. If we consider this fact and study nature's laws and principles, she unfolds to us her secrets, the secrets of health and immunity from disease.

One hundred years ago, Fox, in writing on the subject of prevention of caries, said: "This delightful secret we can only expect to acquire when the philosophers' stone and the great panacea have been obtained." In this prophesy there may be more truth than would appear at first thought, for in the past consideration of dental caries as a disease in itself, some very vital factors have been almost entirely ignored, which may hold the key to the solution, namely, food as the source of life's nutrition, its vitality and immunity, its powers for construction and destruction, not only in its application to the mouth, but to the system as well at one and the same time. We all know that the proper nutritive elements are required to construct strong bodies as well as strong resisting teeth, but little is understood as to the systemic immunity necessary to protect and defend these organs once perfected, and nature's power to destroy them as a penalty for her violation.

We have long known that food was responsible for decay. We know the class of foods that have caused destruction, but not entirely why, because the general system itself has been left unconsidered. It may appear radical to state that there is every reason to believe that dental caries as well as pyorrhea are not diseases in themselves, but the result of a food disease, malnutrition, and that these are a manifestation of bodily disintegration, to be classed and treated as such systemically as well as within the mouth.

Food scientists claim that ninety per cent. of all human ailments arise in the alimentary canal as a result of improper use of food. The most pronounced of these are rickets, scurvy, pellagra, beriberi, and from recent developments it appears that infantile paralysis and tuberculosis also may fall under this class.

Indications all point to the fact that dental diseases are directly due to systemic lime starvation and acid waste accumulation within the body, due to the perverted and intemperate use of starch and sugar, chiefly through a one-sided diet, in which the lime elements (potash and soda) are lacking; the result of ignorance, carelessness and an inclination to feel that "where ignorance is bliss, 'tis folly to be wise" in the matter of eating tempting foods. These statements just made are not refuted by past investigators, for they have not considered them in this light. Pickerill's work substantiates these in innumerable ways, though his conclusions do not follow them at all. The investigation of all food scientists bear out these principles. The research work in plant and animal science verify them, too, for it is but the penalty of nature for the breaking of her laws; it is but the eating of the forbidden fruit, from which the beginning of man has been his downfall—eating that which has not been earned by labor of body or mind; namely, an excess of food not necessary to the bodily economy.

The solution of the problem of health for better or worse has been worked out individually since the beginning of time, to be won or lost as we cultivate or ignore our instinctive guidance in this matter. The science of producing and perfecting the physical body of man today is as possible as in the days of the highest development of ancient Greece, by an understanding of the dietetic problems as applied to our food today and its intelligent application.

This subject covers a field so broad and far-reaching in its possibilities, as applied to the future of mankind, that its importance can only be estimated by the deeper understanding of its principles. It carries us back to the very inception of life itself, for life as we understand it, is that little spark within us, embodied in the nutrition with which becomes our body. As we assist nature in this by nourishment and care of the proper kind, just so do we become endowed with vitality and power or resistance against all disease—the power of immunity.

It is said that we are a degenerating race, physically, that we have sacrificed our health and teeth in the mad race of civilization. If so, it is because in our attempt to improve over nature we have ignored our instincts and have denatured ourselves. Regardless of this view, as far as degeneration is concerned, it is said that there is but one disease that can be inherited, and with this one exception, almost all infants, when they enter this world, are endowed with normal health, even when the parents themselves are in severe stages of disease, such as tuberculosis. That if such an infant is taken away from its unfavorable surroundings at once and properly nourished, it will develop into a healthy, normal individual in spite of its unfavorable birth. Such is the wise protection of nature, who endows, with few exceptions, every living creature with a birthright of health, to be forfeited only by ignorance and disobedience of her simple laws. This latter penalty had been applied almost exclusively to civilized man, through lost instinctive dietetic knowledge, which is a ruling guide in all matters in the plant and animal life. What is possible of animal development must be possible with man. But health must be built; it is not a matter of accident or chance. Civilization has been led to believe in the magic power of drop or pill, to restore what years of careless living and neglect have torn down—a delusion that in the past has made physical advancement impossible, and today the state of health and teeth is simply appaling. We cannot help noticing the coincidence in the close relationship between these two, for the cause of both are one—a lack of nutrition. Of all the laws of nature, this one is the most violated and least understood.

We should have the most complete conception of the true use of food, of its application in the construction of every fiber and tissue within us. Instead, we have practically no understanding of its powers to build and destroy. It has been made a toy, a thing of amusement and entertainment, and in this perversion of our food we have dissipated slowly but surely, our bodies and our health.

Until through proper education, a greater respect for dietetics is created we cannot expect marked physical improvement. No synthetic food has ever been compounded that can nourish the body, for this requires organic food, which nature alone has the power to construct. This shows clearly the failure of inorganic drugs to nourish the body, but instead they are often the causes of systemic destruction, as we see frequently in the action of iron taken internally—its effect upon the teeth and digestion as well. Today there is a murmur of a great awakening—back to the natural rather than the artificial life—back to the call of instinct that has almost been lost through neglect. Only recently we have now and then heard a suggestion that proper diet may hold the solution of dental diseases, though little has been written to date in dental literature on this subject, as far as personally observed, except as it mechanically affects the teeth. Dietetics have not interested the dentist in the past, and most physicians have given it but passing consideration of a general nature. Today, one by one, diseases are coming to be recognized as food diseases, through the denaturing and perverted use of foods.

The recent epidemic of infantile paralysis in New York followed directly the requirement to Pasteurize all milk, which destroys the life or vitamines in it, resulting in the lowering of bodily resistance. Scurvy in infants also became decidedly more frequent, and Dr. Emmet Holt, eminent as a child specialist, pointed out the urgent need of vitamine replacement by orange juice and fresh vegetables in the diet to restore this needed element, as well as mineral salts. We have here some food for thought, as to the undermining of the deciduous teeth through nutritional conditions in bottle-fed infants, who show such marked increase in incident of caries and lowering in vitality, where canned or Pasteurized milk is used; for from the vital foods which we eat, the storage battery of the system—our vitality—is charged.

In Pickerill's investigation of the mouth, nothing seems to have been left unexplored. In taking up the study of the diet of immune races, probably fifty in number, the most vital features from a dietetic standpoint were entirely overlooked in his conclusion. In summing up the points of similarity among these dietaries, which vary so greatly in range, he states that these two facts are the most impressive, namely: That a great variety of foods were used, but that the one and only link connecting all the diets was the tendency to use some sapid, acid or acid-sweet or salt as a flavoring to stimulate the salivary glands. He suggests that as a lesson from this, that a little acid fruit eaten at the beginning and end of a meal would have a greatly beneficial effect on tooth preservation, stating that these stimuli increase the alkalinity of saliva and also stimulate all digestion secretions; but that of the whole alimentary canal, the mouth was the most important—that what was good for the mouth was beneficial for the other organs of digestion as well. Doubt however has been expressed as to whether the mouth or appetite can be trusted too far, in our present mode of eating.

A careful study of these same diets of those immune races reveals the true underlying principle of a chemically-balanced diet, ideal for physical development, the result of instinctive selection for bodily requirements, no attention at all to which is given by Pickerill. The simple mode of cooking, preparation, combination, quantity and proportion are all strictly in accordance with the ideals of dietetics as prescribed today by those familiar with this subject.

In the diet of plant, animal or man, an alkaline balance of the life blood is required for perfect health; a deviation from a normal towards an acid state at once lowers the vital resistance to disease and its germs. In animal life the balanced ration is simplified by the use of foods in their natural state, with their alkaline elements intact, their vitamines undestroyed. In man, complexity comes just to the extent that food is refined and denatured in the preparation and cooking. Where instinct is followed today in the selection and preparation of foods, we find the diet similar in combination to those of the immune races mentioned, and corresponding to the principles advocated by the food specialists as a cure for most ailments today. The balanced diet is a much-discussed subject, but also little understood, for most so-called balanced diets are mechanically balanced, lacking in chemical harmony, without considering the individual's needs. Chemically, we must consider the tendency of certain foods to ferment readily, and create acid waste, such as the proteids and carbohydrates principally, and classed as potentially acid foods. The others, which oxygenate and neutralize them with their alkaline salts, as well as supplying tissue salts, as the salad vegetable, acid fruits and non-starchy vegetables, are classed as potentially alkaline.

For the body's protection, these acid wastes must be neutralized as far as possible, even if nature must draw upon the lime-containing structures of the body, when this is not supplied in sufficient quantities by alkaline foods. Such is the case as we find it in a condition where the ravages of caries are at work, where sugar or starches have predominated in the diet, as will be shown later. A very noteworthy factor in the diets of the immune races was a moderate use of carbohydrates and proteids when combined. Generally we find the diet containing but one or the other, seldom both together. To balance these, an abundant variety of herbs, roots and fruits were used, both cooked and raw; the latter, as we know, are especially prophylactic in cleansing the teeth mechanically as well as of great value to the system. Their cooking was in the simplest way for perfect digestion: roasting, steaming and baking, which retain the natural juices of foods. It will be noticed that the use of cereals and concentrated carbohydrates were the exception. Rice was largely used, and is today the chief article of diet of the Orient. The Chinaman consumes large quantities with impunity and immunity of the highest order. While starch is considered the great destroyer of teeth, Pickerill himself points out that rice as a food digests the most rapidly of all carbohydrates and leaves but little residue on the teeth; it also contains mineral salts, checking fermentation. The Chinaman is a great gardener, and balances his rice with vegetables and fruit, making it a well-balanced diet and prophylactic as well. Is it not easily seen why immunity may exist under such circumstances? This becomes doubly apparent when a comparison is drawn with the diet of civilization today. It has long been known that sugar and starch were directly responsible for caries: their guilt is unquestionable, as they have been caught in the act repeatedly, though how guilty, only by following their activities through the system can we realize. A tracing of these beyond the mouth reveals the underlying cause of why decay is possible, and where immunity is lost by the power of destruction of starch and sugar in their perverted use. Sugar, the most tempting of foods, is at the same time the most treacherous in its activities. Sugar and starch are both composed of carbon, hydrogen and oxygen, the elements that are found in all combustibles and explosives today. Great respect for all these comes only as their powers are understood. Eighty pounds of cane sugar is the annual consumption per capita in this country today. Sugar, valuable in judicious use and so harmful in its abuse, is the most acid-producing and fermentable of all foods; in its direct action in its refined state it has the greatest affinity for lime salts, all of which has been removed in its refining. Water alone will absorb but one part of lime to the thousand; an addition of a little sugar is said to increase this absorption thirty-five times. Sugar renders the saliva acid immediately on entering the mouth, by absorbing all the alkaline salts present and depressing the nerves that stimulate the digestive juices throughout the whole alimentary canal, irritating the mucous membranes to an increased flow. In the stomach its action is similar to that in the mouth, always seeking lime and creating an acid state. It is practically pre-digested food and its absorption into the system is so rapid, it satisfies the bodily need for carbohydrates so quickly, that digestion of other foods taken in conjunction with it is impeded if not entirely stopped, resulting in the fermentation of starches and decomposition of the others; this is nature's only way of riddance of undigested surplus.

Sugar robs the body's storehouse of alkaline salts whenever it may be had and restores no element to the tissues. Its only purpose and use is for the production of heat and energy. By its power to check digestion of other foods it perverts their use from nutrition to fermentation and decomposition, to become a burden to the system as a garbage poison, with its gases and acid wastes, which overload the blood with impurities, clog the system's eliminative organs, producing those chronic ailments of today—that tired feeling, headaches, a low state of vitality, lost immunity—all these are too frequent today; almost the rule.

Starches in excess produce similar results, though much slower and less readily, though in a different way, as they must pass through several stages before they are inverted into sugar of the same kind. Cereal starches, on account of their wide-spread application in our diet, and their tendency to ferment, probably create more destruction when combined with sugar than sugar does by itself. Slow to digest in most every case, they are so seldom thoroughly masticated on account of the soft and spongy nature in which they are generally used, that over-consumption is invited and fermentation is too often the result, the starch not fulfilling its mission at all. It has been shown that lactic acid is produced thereby and more alkaline salts are sacrificed by nature, more starvation of lime.

Where does the lactic acid go? How can the system maintain its alkalinity under such a constant drain? Where can the saliva get its supply of lime salts necessary for the protection of the teeth when the bodily fluids themselves are acid (or nearly so)? With the diet of today, of those in sedentary life, bread, pastry, meat and potatoes predominating and combined in nearly every meal, all heavy foods, acid-producing, with little alkalinity for balance, what can the result be? Others, including Pickerill, have shown that bread, called the "staff of life," is far from an ideal food in almost every sense of the word, as it is eaten today. White bread especially, high in starch, lacking in minerals, too light to be substantial, too soft for thorough mastication as it is usually eaten, is more productive of harm than good. This is especially true when fed to children, whose habitual lack of mastication is only too well known. In the whole-wheat form, when it is properly made, baked or toasted in a manner that requires and invites proper mastication, bread is an excellent food, but requires, even then, a limitation. The most common, and at the same time the most vicious habit allowed and even encouraged today among children is "piecing," or eating between meals, especially so where the combination is soft bread and sweets. More constitutions are undermined, more teeth sacrificed through this unwitting error of mothers, than through any other dietetic error except an unrestrained use of sweets. As fermentation alone produces no acute symptoms, little or no attention at all is given to it.

Taken at a time when a previous meal is still undergoing digestion, as yet uncompleted, a process of fermentation is the direct result, not only of the fresh food, but also of the undigested part. The nutrition of both are lost and malnutrition eventually is the result. Loss of appetite in some cases, ravenous and starved in others, with a general decline in vitality and an increase in caries, are all very apparent in a large per cent. of children today.

Inquiry among the parents as to the dietetic habits of such children, and personal observation verify this in nearly every case. Among the children with the sound teeth, if we study their history, we find simple, regular feeding the usual rule. If we can teach and impress on the parents the need of dietetic knowledge and its application, we can render a service to the coming generation, as well as the present, beyond our power to estimate. To watch the public in the eating houses select their foods is a study in itself. Again we find but a verification of these principles, if we compare these individuals' mental and physical appearance with the food with which they build. Study your patients, their apparent health as we may read it.

The mouth, that barometer of the system, has its story to tell of food abuse and body abuse. The decayed teeth, the diseased gums, the coated tongue, the breath, all point to the same source—perverted nutrition.

Inquiry as to diet of practically every one susceptible to pyorrhea or caries, again will verify the cause: too much starch, often too much meat, starch or sugar in caries especially, always a lacking in nutrition in both diseases of those alkaline potential foods so necessary to health. We cannot fail to connect the conditions of the mouth found in both caries and pyorrhea with perverted use of food. Can we longer ignore these diseases in their true light to be prevented by systemic nutrition in balanced form?

The examples of the natural diet of the immune races, with its result in physical development in all its details, gives us an ideal on which mankind must build. Moderation in proteids and carbohydrates must be regarded, especially when combined; a balance by fruits and vegetables, cooked and raw, the more simplified cooking of foods in simple combinations, the use of more salad vegetables, which are nature's best dentifrices—these are the sign-posts that point the way to health.

Horace Fletcher has done more than any other man probably in teaching a true respect for food—that by careful mastication we may reclaim our instinct in the proper selections of those elements needed by the body—that by careless, rapid eating, taste had been acquired for food of an unsuitable nature, and that careful mastication and a cultivation of natural tastes will restore health where other means have failed.

Who has greater opportunity today than the dentist to point the way to health through simplicity in diet? The great need for fresh fruits and vegetables, the alkaline foods, and above all, regularity in diet to allow nature to reassert herself in restoring to us our birthright. Is this not the call within us to thoughts that we have all felt and considered many times before—of things which we have always known, though probably little understood? Is not here the ideal we are seeking, the conservation of human health?

CONCLUSIONS

From ten years' practical investigation and observation of the relationship between dental diseases, the systemic condition and the diet, the following conclusions have been reached, which conform to physiological and natural laws as well as common sense and instinctive knowledge:

That any idea of a separate consideration of these diseases, apart from the system and its predisposing causes, must be abandoned as erroneous and illogical;

That immunity of the teeth is only possible through bodily immunity, which fluctuates with the state of health and vitality;

That immunity stands for right living, an obedience to the laws of health, the most vital of which is a *well-balanced diet*, suitable to the occupation and environment of the individual. Such a diet means *less* refined and denatured and complicated foods, a *moderation* of the heavy, heating foods, the proteids and carbohydrates, and more *liberal* use of the fresh vegetables and fruits, for these are the real vitality foods, the essence of the blood and digestive juices, and the tissue salts which hold the balance of power in maintaining the normal alkalinity of the blood itself, on which all secretions must depend. Such a diet, containing fruits and vegetables, is prophylactic to the teeth as well as to the system. This is especially true of the *raw* salad vegetables and fruits, as pointed out by Pickerill, Dean Owre and others, as an almost perfect means of oral prophylaxis of itself.

That a similar balance of diet is essential to all herbivorous animals, and is the keynote of the *immunity* enjoyed by *immune races.*

Such a balance is observed today almost invariably among the Jewish race, known for their temperance in food and drink, and an unusually high standard of excellence in health and teeth.

The following practical proofs may be verified in nearly every instance by personal observation and inquiry as to diet: That those children strongly susceptible to dental caries are eating a one-sided diet of a great excess of starchy food, especially white bread, combined with sweets, piecing between meals on more starchy food, with a limited amount of fresh vegetables and fruit at meal time. An inclination toward malnutrition is to be observed in most of these.

In the adult susceptible to caries again we find a preponderance of starchy food and sweets, often a great variety of starches at the same meal, to the exclusion again of fruits and vegetables so essential to combustion, elimination of wastes, resulting in acid fermentation, acid absorption to saturate the bodily secretions, an inclination to digestion disorders, often malnutrition.

In pyorrhea, where the teeth are so often found *sound*, a *plain* diet is usually the rule, with little sweets, though composed of meat, bread, potatoes, heavy foods, lacking in the element—fruit and vegetables—a coated tongue with its story is observed, a tendency to rheumatism in later life, a system saturated with uric acid wastes, to be deposited by nature in weakened parts.

Where the teeth are not decayed, we seldom find sweets of any quantity combined with starch, as this guilty pair go hand in hand, the sugar as the palate coaxer, the starch as the great destroyer.

Are these not ample proofs of why dental diseases occur? Always the lack of fruits and fresh vegetables in sufficient quantity for bodily needs in almost every case.

We owe a greater service to society than the art of dentistry alone affords. If we are truly working for the welfare of the general health of all we must broaden our field of usefulness by education along the lines of pointing out the necessity of a well-balanced diet at *regular* intervals, that the digestion may be supplied its essentials for building, and have its rest, instead of its abuse and misuse, so common today.

Only by great care in such matters can the coming generation build sound health and teeth. Only on such care can the susceptible depend to conserve and improve his bodily conditions, and reclaim his birthright—immunity—by means of nature's only plan: Right eating, right living, following instinct more, our inclination less, for nature alone is the true guide.

Eilers Building.

Dental Lac and Spence Metal

In making the tooth model for a jacket crown, if dental lac is used for the impression and Spence metal used for pouring the model, beautiful results will be obtained.—*Dental Review.*

THE ROENTGEN-RAY IN THE DIAGNOSIS OF PYORRHEA*

BY HOLLIS E. POTTER, M.D., CHICAGO, ILL.

ROENTGENOGRAPHY, for the demonstration of pyorrhea alveolaris does not differ in its technical plan from that used in other procedures intended to shed light on diseases located in the jaw bones. The constant feature of the disease which makes its demonstration by Roentgenoscopy possible is the ulceration of the presenting margins of the alveolar process and the more intimate bone about the roots. In general, the extent to which this marginal bone is found to be eroded is the measure of the extent of the disease recorded on Roentgen-ray films or plates. The relative simplicity of a Roentgen-ray procedure, which is required to show only the height or depth of a bone profile in so thin an object as the human jaw, is quite apparent, and in reality no such rigid technic is necessary in pyorrhea as in the demonstration of periapical disease, in which a focus of minor decalcification must be detected in and surrounded by a considerable mass of bone of variable and often complex structure.

This rough delineation of the general present depth of the process with respect to the dental roots in a case of known pyorrhea is therefore a relatively simple problem, and in itself is scarcely deserving of a lengthy dissertation. But in any series of pyorrhea cases the general Roentgenographic survey is capable of bringing to light some of the minor changes about the roots of individual teeth, such as the localized or beginning extension of the disease toward a given apex, the softening of the adjacent alveolar wall due to an early inflammation of a single peridental membrane—the signs, in short, of the early and deeper encroachments of the disease which are so important in the complete diagnosis and prognosis of a pyorrhea case. For the detection of these minor but most important changes in the bony investments of the teeth only the most critical Roentgenography is of value, and this must be combined with a careful and intelligent reading.

In Roentgenograms of the normal denture, the spongy bone of the jaw uniformly envelops the dental roots and proceeds fully up to the point of attachment of the peridental membrane. In the most critical Roentgenograms, the shadow of this spongy bone is seen through the shadow of the dental root, but is most prominently visible in the septal bone. The septal bone is characteristically of triangular shape, with more compact bone at the marginal apex, and at this apex one often sees an apparent fusion of the white line surrounding the adjacent roots. This so-called white line is the shadow cast by the denser walls of the alveolus between which and the roots themselves is the slight space occupied by the peridental membrane.

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*Read before the Section on Stomatology (A. M. A.), of which THE DENTAL SUMMARY is the representative organ for the dental profession by special arrangement with the Jour. Amer. Med. Assoc.

It is well-known dental pathology that in pyorrhea the primary site of bone liquefaction is in that bone immediately adjacent to the peridental membrane. For this reason it is so often seen in Roentgenograms that the marginal line of persistent bone is wavy with the deepest erosions in juxtaposition with the teeth. Whenever in Roentgenograms it is seen that a localized or deeper absorption has occurred, it must be admitted that no correct inference can be made as to whether this erosion lies primarily on the labial, buccal or lingual aspect of the process. There is seldom seen in the most critical Roentgenograms a double marginal line which could be known to represent, respectively, the inner and outer limits of erosion, and even where the double line is seen, it is impossible to distinguish the inner from the outer. Moreover, the film method calls for the projection of the light at such angles that, while the teeth show with minimum distortion, there is a palpable displacement on the film of the position for attachment of the peridental membrane externally with respect to its internal attachment. Should, therefore, the double line be visible in every case, a correct interpretation would involve a reasonable discount for angular displacement. For this reason, the most accurate and comprehensive portrayal of the exact position and the extent of the erosion is often obtained by the stereoscopic method, in which the stereoscopic shift is made along a vertical line rather than along the usual horizontal line, for reasons apparent to those versed in stereoscopic Roentgenography in general. To obtain the most valuable average line as a gross measure of the ulcerative process, Roentgenograms may be made at a considerably lower angle than for demonstration of the apexes, although an elongation of the dental shadows themselves will result.

Whether or not the general line limiting the ulcerative process can be followed across the shadows of the roots themselves, it will usually show plainly in the region of the septal bone. Wherever the teeth are normally spaced and the septal bone abundant, the marginal dissolution at the interspaces is very plain. In case the teeth are closely crowded and the septal bone small in amount, or when for any cause the ray angle used in the exposure was such that a lateral overlapping of dental shadows has resulted, the depth of septal bone is indeterminate. Inasmuch as the septal bone erosion is usually less than that in the immediate vicinity of the peridental membrane, the amount of septal destruction is not to be taken as the true limits of the encroachments of the disease on the jaw. Rather, this must be based on a careful observation of the integrity of the bone enveloping the peridental membrane farther toward the apex. Often a lateral or circumferential absorption can be followed deeply toward the apex. This appearance denotes a localized pyorrhea pocket, and is often concentrically funnel shaped. In conjunction with this funnel-shaped dissolution, which extends around the tooth to a greater or less depth beyond the line of septal erosion, is often seen a more delicate partial decalcification of the white line extending to and around the apex, together with a slight widening of the space occupied by the peridental membrane itself. This finding is the premonitory sign of the inflammation of peridental membrane which precedes extension of the funnel-shaped pocket to and around the apex. It is now only a matter of a short time till the entire depths of the root are surrounded by the liquefied products of the ulcerative pericementitis.

The limitations in the value of the Roentgen findings in any disease should also be mentioned. While the Roentgen findings in pyorrhea as a rule agree very well with findings elicited by a digital or instrumental examination, and are obtained with far less discomfort to the patient, there are certain respects in which they are disappointing. Let me mention a few of these: Sometimes a pyorrhea tooth is quite loose, and a well-defined pocket is expected in the Roentgenogram. Instead, it may require a stretch of the imagination to find in the Roentgenogram more than a simple loss of the normal white line. This is undoubtedly because the atrophy which has occurred is diffuse and poorly demarcated. Again, the tooth shows no looseness on examination, and the Roentgenogram shows the deepest kind of a pocket. This apparent discrepancy is undoubtedly due to the escape from the disease of a limited portion of the investing structures, not recognizable Roentgenographically, but sufficient in amount to maintain the stability of the tooth for the time being. A very important point in the diagnosis may be entirely undemonstrable by Roentgen methods, and I refer to the activity of the disease at the time of examination. Quite frequently Roentgenograms are essentially similar in cases in which gross amounts of infective material can be expressed from the jaw to those in which the disease in all its clinical manifestations is entirely quiescent or advancing at a very slow rate. It may be sufficient to mention the general Roentgenographic fact that in an ulcerative process in which bone shadows show partial or poorly limited decalcification, the process is in an active or rapidly progressive stage, whereas in well demarcated cases, in which areas of complete liquefaction lie directly adjacent to areas of undisturbed bone, the process may be considered more chronic in type.

CONCLUSIONS

A general survey of the denture by a series of dental films is an important adjunct to the examination of a pyorrhea case. It is often a short cut to a diagnosis and is less disagreeable than an instrumental examination, but should supplement rather than displace other diagnostic methods. The most important diagnostic points are observable in the region of the intimate bony investments of the roots and are obtainable only from the most critical Roentgenograms.

122 South Michigan Avenue

THE IMPORTANCE OF A CORRECT DIFFERENTIAL DIAGNOSIS OF THE PREDISPOSING CAUSES IN CASES OF INTERSTITIAL GINGIVITIS OR PYORRHEA ALVEOLARIS*

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PERIODICALLY, we are told that interstitial gingivitis, or pyorrhea alveolaris, is caused by some special organism which the writer has just discovered. Specific investigation and attempts to corroborate these vaunted discoveries have always proved them to be erroneous. We are just beginning to recover from the shock of how little we know about the *endameba buccalis.* The fact that a prominent research worker in medicine proclaimed to the world that the endameba was responsible for every case of pyorrhea, and that this disease was present in ninety-five per cent. of our population, has been the direct cause of much confusion. Physicians lacking education in mouth physiology and pathology were especially imposed on by this dogmatic assertion.

Research work which I have conducted in the mouths of animals has corroborated the work of general observers to the effect that infection is impossible in an individual otherwise physically well. Considering, as we are, end-organ tissue, it must be admitted that unless prophylactic measures have been adopted, the so-called dental organs are the first to exhibit a diminution in immunity to infection, if any form of malnutrition is in evidence. If, by exercise, massage and other hygienic measures, the circulation in the ultimate capillaries is kept moving, the gums and peridental tissue will frequently retain their immunity, even though malnutrition is present.

Pyorrhea alveolaris is a result of malnutrition plus infection, and also most frequently plus irritation, and it is greatly intensified if arteriosclerosis of the ultimate capillaries sets in. Only daily observation of the dental tissues can make one familiar with the appearance of a normal mouth, and without this knowledge, it appears impossible for any one to differentiate the different appearances of these tissues in different diseases.

While all forms of pyorrhea must commence with some form of gingivitis, yet the tissues in this and all succeeding stages vary in clinical appearance as markedly as do the generic types of malnutrition which interfere with a proper equilibrium of the circulation. The blue line in the gums as a result of mercurial toxemia, and the mucous patches due to syphilis, are old landmarks in medical diagnosis. In like manner the physician awaits the eruptive stage in order to make a correct diagnosis as between smallpox and measles, or any of the other exanthems. It may, therefore, be asserted with assurance that the variations in clinical appearance of the gums and pericemental tissues point with unerring fidelity to the cause of the dyscrasia. When these are once read with the same assurance with which we now read the blue line, a great advance in the diagnosis of this disease will have been reached. When it is once duly appreciated that pyorrheal symptoms are a possibility at the very onset of any interference with the normal action of any vital function, and that a proper reading of their clinical appearance will disclose at once the nature of the trouble, the study of the dental organs will be properly comprehensible, and not until then.

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*Read before the Section on Stomatology (A. M. A.), of which THE DENTAL SUMMARY is the representative organ for the dental profession by special arrangement with Jour. Amer. Med. Assoc.

The fact that pyorrheal manifestations are very frequently observed, without the investigator being able to obtain any confirmatory diagnosis of some form of malnutrition, is generally due to the fact that impairment of the vital organs progresses very slowly, and that frequently with our present-day methods it is impossible to make a correct diagnosis until the disease has reached an advanced stage.

When, finally, as the organic disease increases, a correct diagnosis is made, it is not uncommon to find that this organic disease is believed to be caused by the pyorrhea. The poor diagnostic sense of the uninformed dentist is the cause of this frequent error in diagnosis, this placing of the cart before the horse. While an abnormality of some important organ or organs of the body is generally the predisposing cause, we see other types of pyorrhea where the predisposing cause is the decrease in functional power of the teeth themselves. Here loss of teeth by extraction, irritation under the gingivæ from unpolished fillings, and every type of malocclusion become the predisposing causes instead of their being caused by some organic disease.

Every dentist will corroborate the great variation in the mouth picture which presents itself in different pyorrheal cases. We see the case without any deposit on the root in strong contrast with those in which these deposits seem to overwhelm all the exposed root structure. We see the gum abnormally dry and parched in contrast to those cases in which the mucous follicles are constantly excreting varying quantities of fluids. There is the pale anemic gum in contrast to the ruby red inflamed gum. We find pockets under the gums free from suppuration or exudation, in contrast to those cases in which there are purulent discharges, and the gums are so inflamed and spongy in character as to bleed on the slightest provocation. There are cases in which the gingival border is atrophied to a knife-blade edge in contrast to every type of hypertrophied tissue. The gums at times will be found in all possible shades of color, and in certain cardiac diseases there is a sharp division line between a normal pink and dark blue in the gums in the same mouth.

We find no such variation in symptoms in any infectious disease. Smallpox, tuberculosis, typhoid fever, measles, syphilis, yellow fever, diphtheria, etc., all possess well-defined symptoms, which mark them unmistakably as the disease in question.

In interstitial gingivitis or pyorrhea alveolaris, the clinical appearance is but a reflection of the predisposing cause. Each different picture will always be found associated with one particular predisposing cause. A carefully recorded study of these different pictures will soon make the observant stomatologist familiar with at least some of the more common types of malnutrition, and after a time he can readily recognize them on sight.

It has been my good fortune, because of experience with these clinical pictures, frequently to have been the means of directing the patient in the early stages of some serious ailment in keeping with rational treatment. It is impossible to estimate too highly the value of such a diagnosis being made in an early stage. It is wrong for us to discuss this subject as though we were speaking of some specific disease instead of addressing ourselves to pathologic symptoms of one of many diseases.

The time will come when the subject is under discussion, that it will be confined to the particular malnutrition causing a given type of pyorrhea. In 1894 I presented such a method of classification by prefixing or adding an adjective stating the name of the disease which is causing the pathologic symptoms in the oral cavity, as "diabetic pyorrhea," "tuberculous pyorrhea," etc. Only under such a classification can rational discussion be held on this subject. Take, for example, "nephritic pyorrhea" and "diabetic pyorrhea." While renal abnormalities occur in the predisposing cause in each type, nevertheless, the symptomatology and treatment should be entirely different in each type. When this point is conceded, due importance will thereafter be given to the necessity of making clear the nature of the predisposing cause of the cases under discussion.

It is well understood in general surgery that operative procedure is attended with great danger to life itself in patients suffering from diabetes not under control. Consequently, the same danger to life exists when surgical interference is commenced in pyorrhea when there is present an active condition of diabetes. The at-one-time well-nigh universal habit of dentists using surgical intervention in diabetics without making any diagnosis of the predisposing cause has produced its quota of fatal consequences. In advanced stages of fatal diseases, it would be unnecessary brutality to subject the patient to the discomforts of surgery. On the other hand, when the disease is curable, it is of great importance that the stomatologist should be given an accurate statement by the internist of every body disturbance, so that all local treatment should proceed in therapeutic harmony with the general treatment.

Prognosis of pyorrhea or gingivitis must largely depend on the possibility of obtaining a cure of the malnutritional factor. It is for this reason that the results of all physical examination, etc., should be in the hands of the stomatologist, so that not only can he work in harmony with the physician, but also keep accurate record of any tissue changes that may take place.

When the preponderating importance of an accurate diagnosis of the predisposing cause of pyorrhea is appreciated, an important factor in the maintenance of our point of view is established to the effect that the dentist treating these and all other mouth diseases should be as efficiently educated in general medicine as is the specialist in any other department of medicine.

38 East Sixty-first Street.

BACTERIAL FINDINGS AND THEIR RELATIONSHIP TO PYORRHEA AND INTERSTITIAL GINGIVITIS*

BY A. W. LESCOHIER, M.D., DETROIT, MICH.

FEW SUBJECTS in medical history have given rise to more frequent controversies than the inflammatory diseases of the gums. The classification, nomenclature, pathology, even the anatomy of the parts involved have afforded material for protracted argument. Probably no phase of the subject has been more keenly discussed than the etiology, and during recent years much of this interest has centered on the part played by bacterial invaders.

The probable relationship of pathogenic bacteria to the development of pyorrhea has been recognized for several decades. Mallasez and Galippe[1] (1884), Black[2] (1887), Miller[3] (1889) and Kirk[4] (1898), were some of the early investigators of its bacteriology. A variety of organisms were described, none of which could be specifically associated as the causative factor. Probably the first to ascribe etiologic significance to any particular microorganism was Arkœvy[5](1904), who attributed acute cases of alveolar suppuration to streptococcic infection.

A detailed review of the voluminous literature on the bacteriology of pyorrhea and allied conditions appears neither necessary nor desirable. Many of the reports were based on studies the scope of which was limited both by the paucity of cases under observation and the facilities and training for their intelligent investigation. It seems advisable rather to try to correlate the facts established by those investigators who have definitely contributed to the bacteriology of the disease.

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*Read before the Section on Stomatology (A. M. A.), of which THE DENTAL SUMMARY is the representative organ for the dental profession by special arrangement with the Jour. Amer. Med. Assoc.

1. Mallasez and Galippe: Compt. rend. Soc. de Biol., 1884.
2. Black: Indep. Pract., New York, August, 1887.
3. Miller: Die Mikroorganismen Mundhœhle, Leipsig, 1889.
4. Kirk: Dental Cosmos, 1898.
5. Arkœvy: Brit. Med. Jour., Nov. 19, 1904, ii, 1371.

Perhaps the most notable of the early studies on the relationship of micro-organisms to the pathology of pyorrheal diseases is that of Goadby[6]. His first report in 1907 described a variety of organisms occurring in connection with pyorrhea, to none of which it was possible to attribute a definite etiologic relationship. This group of organisms included, in addition to the pyogenic cocci, various types of bacilli and spirilli. Curiously enough, in view of later developments and the fact that a study of his protocols shows that streptococci and staphylococci were found much more frequently, Goadby appeared to attach considerable importance to the bacillary forms. In 1908 Goadby reported the successful treatment of two acute cases of pyorrhea alveolaris with autogenous vaccines; in one of these the infection was mixed streptococcus and *Staphylococcus albus*, and in the other streptococcus was present almost in pure culture. In 1909-1910 a supplementary study of seventy cases was reported, in which the findings are given in Table 1:

TABLE 1.—ORGANISM FINDINGS IN SEVENTY CASES OF PYORRHEA ALVEOLARIS

Organisms	No. Cases Present
Streptococcus	19
Pneumococcus	5
B. necrosis dentalis	14
M. catarrhalis	23
B. septus	15
Staphylococcus aureus	12
Saccharomyces	5
Micrococcus citreus granulosis	6

During the period from 1907 to 1912 articles dealing with the bacteriology of pyorrhea were contributed by numerous workers, among whom may be mentioned Carmalt-Jones and Humphrey,[7] Sims,[8] Eyre and Payne[9], Fletcher,[10] Beebe,[11] Best,[12] Williams,[13] Logan,[14] and Leary.[15] The results of their investigations were diverse and do not materially assist in clearing up the confusion existing relative to the bacteriology of the disease. The only deduction which they justify is that a number of micro-organisms, potentially pathogenic, may under certain conditions be isolated from suppurative lesions of the gums.

The possibility of spirochetas being concerned pathologically in pyorrhea has received some attention. Various workers, including Noguchi, have described spirochetal types found in the oral cavity, and in 1912 Noguchi[16] isolated, in pure culture, from a case of pyorrhea a mucin-producing spirochete which he named *Treponema mucosum.* This organism is not regarded by Noguchi as strictly parasitic, but he ascribed to it pyogenous action under conditions in which the tissues have been so injured as to enable it to survive. The strong fetid odor in some cases of pyorrhea he believes to be due in part at least to the presence of *T. mucosum.*

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[6] Goadby: Brit. Med. Jour., Sept. 9, 1905; Tr. Odontological Soc., March, 1906; Lancet, London, March 9, 1907; Brit. Med. Jour., Aug. 22, 1908; Lancet, London, Dec. 25, 1909; Practitioner, London, 1912, lxxxviii, 107.

[7] Carmalt-Jones and Humphrey: Lancet, London, Dec. 28, 1907.

[8] Sims: Dental Practitioner, Toronto, Oct., 1908.

[9] Eyre and Payne: Proc. Roy. Soc. Med., Odontological Section, Nov. 22, 1909.

[10] Fletcher, M. H.: Unclean Mouth and Its Evil Results, The Jour. A. M. A., July 13, 1912, p. 94.

[11] Beebe: Boston Med. and Surg. Jour., Oct. 28, 1909.

[12] Best: Dublin Jour. Med. Sc., cxxxiii, 91.

[13] Williams: Am. Jour. Med. Sc., 1911, cxii, 666.

[14] Logan: Dental Rev., 1911, xxv, 649.

[15] Leary: Dental Cosmos, 1909, p. 55.

[16] Noguchi: Jour. Exper. Med., 1912, xvi, 194.

Recent bacterial studies which seem to be entitled to careful consideration are those reported by Medalia,[17] Brown,[18] and Hartzell.[19]

Medalia's reports were based on a study of 115 cases, in which a careful bacteriologic investigation appears to have been carried out. The series included fourteen incipient, sixteen moderately advanced, and eighty-five advanced cases. The findings reported are as given in Table 2:

TABLE 2.—BACTERIAL FINDINGS BY MEDALIA IN 115 CASES OF PYORRHEA ALVEOLARIS

	No. Cases with Organisms	Per Cent.
Incipient Cases (14)		
Pneumococcus and staphylococcus	10	71
Pneumococcus	2	14
Staphylococcus and streptococcus	1	7
Sterile	1	7
Moderately Advanced Cases (16)		
Pneumococcus and staphylococcus	8	50
Pneumococcus	6	37
Staphylococcus	1	6
Sterile	1	6
Far Advanced Cases (85)		
Pneumococcus and staphylococcus	49	57
Pneumococcus	18	21
Staphylococcus	1	1+
Pneumococcus and streptococcus	3	3+
Pneumococcus, streptococcus and staphylococcus	10	12
Pneumococcus and Micrococcus catarrhalis	1	1+
Staphylococcus and Micrococcus catarrhalis	2	2+
Sterile	1	1+

We would be led to infer from these results that the pneumococcus is the most important organism to be considered, as it was found either alone or in combination in 107 of the 115 cases (93 per cent.), and the streptococcus only an occasional invader, as it was reported as being present in only fourteen cases (twelve per cent.). The work of other investigators does not, however, substantiate this deduction. Brown, in 48 cases observed *Streptococcus viridans* 23 times, hemolytic streptococci 30 times, and nonhemolytic streptococci 28 times. Pneumococci were present in 27 cases, staphylococci, diphtheroids and organisms of the *Bacterium influenzae* group being also frequently found.

Hartzell's work, perhaps the most convincing of any that has been reported, points strongly to the importance of the streptococcus in pyorrhea. His observations have indicated that approximately three-fourths of the bacterial content of pyorrhea pus pockets is made up of pyogenic cocci of the *Streptococcus viridans*, and staphylococcus types, and the remaining one-

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17. Medalia: Boston Med. and Surg. Jour., 1912, clxvii, 868, 922; Dental Cosmos, Jan.-Feb., 1913.

18. Brown: New York Med. Jour., 1915, xcviii, 1201.

19. Hartzell: St. Paul Med. Jour., 1916, xviii, 77; Report First District Dental Soc. of the State of New York, Jour. Allied Dental Societies, March, 1916.

fourth of other organisms. Hartzell's animal inoculations have shown that following the intravenous injection of pus from pyorrhea pockets streptococci of the viridans type are usually recovered, occasionally staphylococci.

Personal observations relative to the occurrence of streptococci, staphylococci and pneumococci in pyorrhea would place streptococci first in frequency, staphylococcus next, pneumococci being observed in only a small percentage of cases.

The scope of this paper does not extend to a consideration of the relationship existing between pyorrhea and systemic diseases. The importance of oral infection in metastatic infections of the heart, blood vessels, joints, kidneys and other tissues is, however, generally recognized. Hartzell has emphasized the fact that of the organisms found in the mouth, there are none having the varied possibilities for disease production characteristic of the streptococcus group. Clinical observations as well as the results of animal inoculations have clearly shown that in the remote pathologic effects of oral infection, the streptococcus overshadows in importance all other organisms which may be present in pyorrhea pockets.

A discussion of the causative factors in pyorrhea necessarily involves a consideration also of its pathology. Considering interstitial gingivitis and pyorrhea alveolaris as phases of the same disease, we generally recognize that bacterial invasion is characteristic of the pus stage and is not necessarily present in cases of interstitial inflammation without pus. The bacterial studies which have been reported are based largely on investigation of cases of the purulent type. The occurrence of gingival inflammation, without infection, as the result of trauma, irritation and constitutional influences during the nonpurulent inflammatory stage of the disease is scarcely open to question. On the other hand, the conclusion of some investigators that bacterial invasion in pyorrhea is invariably a secondary factor, infection being universally absent prior to the pustular stage of the disease, does not seem to be established. An infected zone around the root of the tooth, usually due to acute streptococci infection, may exist. It would be strange indeed if this were not so, since the poorly protected gingival crevice offers a splendid opportunity for bacterial attack, the microbic penetration being aided by the formation of calculi on the roots of the teeth or at the gingival margin and the number of the infecting organisms being augmented by the neglect of oral hygienic measures.

The tendency to consider any etiologic factor in pyorrhea as an entity instead of in relationship to other influences is unfortunate. Irritation, trauma, metabolic disturbances and microbic invasion constitute a vicious circle in the development of alveolar diseases. The bacterial element is probably the most important element in the destructive tissue changes and certainly so in the serious sequalæ. While it is impossible definitely to classify interstitial gingivitis or even pyorrhea as primarily a microbic disease, the pathology is intimately associated with the results of bacterial invasion and the adequate consideration of its treatment must necessarily recognize the importance of the infectious element.

SOME STUDIES IN THE TREATMENT OF PYORRHEA ALVEOLARIS*

BY GEORGE BAILEY HARRIS, D.D.S., SC.M., DETROIT, MICH.

IN THE CONSIDERATION of the treatment of pyorrhea alveolaris, as with any other disease, we must presuppose a knowledge of the disease. There are, however, so many conditions suggested as being causative factors in pyorrhea, that it is hardly possible to assume that any one of them is responsible for pyorrhea, to the exclusion of the rest. Among the conditions which have been advanced as being causative agents in pyorrhea, might be mentioned syphilis, rheumatism, liver affections and auto-intoxication. These conditions and any other which will lower the resistance of the tissues must be considered as causative factors in pyorrhea, and their eradication, wherever possible, must be accomplished when the treatment of pyorrhea is undertaken.

Pyorrhea should be looked on as an infectious disease and treated as such. Its inception, then, is based on the resistance of the tissues to bacterial invasion, which must be lowered before the infection can be overcome. This means the building up of the resistive forces throughout the entire body, as it is difficult to perceive how the resistance, under these conditions, can be raised in the gum tissues alone. This must be done not only to throw off the present infection but also to guard against its recurrence. The lowered resistance to the tissues surrounding the teeth is due, in many cases, to the well-known calcium deposits and irritations produced by faulty dental work. These conditions must be corrected.

If, however, we better understood the causes of pyorrhea and knew more about the tissues most vitally involved in making a repair, we would be able to treat this disease more intelligently, and there would result a greatly increased number of recoveries.

I have been greatly surprised at the wonderful recuperative power of the cementum. The literature relating to this tissue is confined, in the main, to its description and histologic structure, very little being said about its use. Cementum is the bond between the teeth and the bone, the tooth and bone seemingly being unable to form a union themselves. It seems to have about the same recuperative power as bone and, furthermore, under proper conditions, cementum has the power to regenerate, after it has been cut in grooves or removed entirely from the root, provided a sufficient amount of the cementum is left on the root from which regeneration can take place. If however, a large portion of the cementum is removed and the remainder then weakened or entirely destroyed by such mild germicides as trichloracetic or sulphuric acid, we should not expect to have any reformation of the cementum. When this is done, we might just as well take the next step at once and extract the tooth as wait and do the same thing at a later date or let nature throw it off herself.

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*Read before the Section on Stomatology (A. M. A.), of which THE DENTAL SUMMARY is the representative organ for the dental profession by special arrangement with the Jour. Amer. Med. Assoc.

Some time ago I had occasion to make an upper denture for a woman about fifty years old. She had worn full upper and lower dentures for some twenty years. On examining her mouth, I noticed an enlarged and inflamed surface in the region of the second bicuspid. She informed me that it had been giving her trouble for a long time and that she had to have a place cut out of the denture to avoid pressure on it. I opened into it and removed about one-third of the root of the second bicuspid which had been broken off when the tooth was extracted. The one side was flattened, but there were no sharp edges. A cross-section was made, and when put under the microscope it was found to be completely encased in cementum, the cementum on the flattened surface being nearly a third thicker than the other. A section made near the apex of the root showed a normal condition, with no variation in the thickness of the cementum. When this root was extracted, instead of breaking off at right angles, it split at an angle, and the cementum remaining not only regenerated sufficient tissue to cover that portion of the root that had been stripped of its cementum, but a third more. Dr. Fletcher has recorded a case in which the crown had been broken off in an attempted extraction, and the cementum had not only grown over the dentin but also had partly filled the canal. In this case, too, the cementum which had grown over the dentin was much thicker than normal. These cases seem to show that we may expect a restoration of tissue to a great extent, if not entirely, provided the conditions governing such a growth are ideal. This means that the new cementum forming must not be removed daily or weekly in the overzealous use of scalers and files, nor must the healthy cementum and peridental membrane be removed. To get something, something must be left. The regeneration of the cementum must be the result of stimulation, brought about by the careful use of the affected teeth, and there must be an active blood supply. This can be encouraged by careful but not too diligent massage, and the absence of astringent mouth washes. The teeth must be cleaned, not merely brushed.

The bacteria commonly found in pyorrhea are constantly present in the mouth. If oral hygiene is a common practice with the individual, their numbers are greatly lessened; if not, they become very abundant. A person can go for years with ill-fitting crowns and maintain an ideal condition for the development of pyorrhea. That is resistance, and when it is lowered, pyorrhea follows quickly. As long as he maintains that resistance, he is immune; but as soon as it is lowered, pyorrhea overtakes him. In order to recover, that resistance must be returned; otherwise the pyorrhea will only be kept in check, never cured. To prevent the formation of tartar deposits, after they have been removed, epsom salts is most proficient. It might be said that constipation plays an important part in the formation of these deposits, and should form a sort of index in cases of chronic constipation.

There are a great many pathologic conditions which have or are supposed to have their origin in mouth infections, of which pyorrhea is a common and important one; but it must be remembered that there are lots of people with arthritis who are wearing full upper and lower dentures, and had been so doing long before they became afflicted with arthritis. There are a great many cases of arthritis that have their foci in the mouth, but these infections are sometimes present in cases of arthritis, the removal of which does not result in the disappearance of arthritis to any degree. In these cases, therefore, while there may be pyorrhea and other foci of infections present, and while every effort must be made to eradicate them, we must not devote all energy to these infections to the exclusion of foci in other parts of the body which may be the chief foci, and relief cannot be had until they are located and removed. Further, there are many Roentgenograms which show rarefied areas around the apexes of the roots that are rightly interpreted as being foci of infection, but it must also be remembered that there are lots of others which show the same rarefied areas which are not foci of infection, being localities in which there possibly once was a focus but which has been removed, and the tissue not yet completely filled in, which may never completely take place. This is amply proved by using an aspirator and removing a portion of the content of that supposed focus, only to find it to be nearly free from bacteria. Except in extreme cases, therefore, there is no justification for the extraction of a tooth, simply because a Roentgenogram showed a rarefied area, unless substantiated by other diagnosis. The extraction of teeth, in an effort to check infections in other parts of the body, just because a Roentgenogram showed a rarefied area, except in extreme cases, is to be condemned. If this practice is to be indulged in, it must have its completion in the extraction of all devitalized teeth whether or not the Roentgen-ray shows a rarefied area to be present. Also all teeth that are pyorrhetic would have to be extracted because they are foci of infection, and those that are not yet affected would have to be extracted because they might become foci of infection.

A Good Teaser for Solder

A stiff piece of wire is bent at one end so as to form a handle; on the other end the graphite removed from a sharpened lead pencil is fastened with small binding wire. With this, melted gold or solder can be teased to the desired position without adhering to the teaser.

—*C. I. Faison, Dental Digest.*

THE ETIOLOGY AND TREATMENT OF INTERSTITIAL GINGIVITIS*

BY EUGENE S. TALBOT, M.D., D.D.S., CHICAGO, ILL.

MY RESEARCHES of interstitial gingivitis and pyorrhea alveolaris[1] were published in book form in 1899. In this work every conceivable phase of the disease was studied on animals as well as man. The pathology was beautifully illustrated from its beginning to the formation of abscess, on the one hand, and exfoliation of the teeth, on the other.

The object of this paper is to try to make clear the etiology, pathology and treatment based on the researches laid down in my work.

The tissues about the roots of the tooth may become diseased under extreme local irritation or from constitutional disease, but as a rule the progress of tissue building about the first and second set of teeth prevents tissue degeneration. Not until the bone has obtained its growth, from twenty-seven to thirty-five years of age, does degeneration take place to any great extent, although marked inflammation of the gums may be present. When the alveolar process has obtained its growth about the second teeth, the bone may be said to have reached the senile stage, and absorption under favorable conditions begin.

THE ETIOLOGY

In considering the etiology of interstitial gingivitis, my researches have shown that the tissues surrounding the roots are end-organs, owing partially to the fact that the teeth, so far as nerves and blood vessels are concerned, are foreign bodies, and partly to the end-structure of the bone. An end-organ is a structure in the body in which nerves and arteries extend to the extreme end and then stop. The veins being extremely sluggish, the blood containing poison remains, and, being unable to return, sets up a low form of inflammation. The dental pulp is the best example of an end-organ in the human body. A study of this structure under the microscope, of persons over forty years of age, will reveal all the degenerative pathologic conditions possible.[2]

The blood, then, which flows into the alveolar process, owing to local irritation about the gum margin or root of the tooth, does not return into the circulation. Blood charged with metallic, drug or body poisons collects in the alveolar process and produces irritation. Stasis results (*Fig.* 58, Interstitial Gingivitis[1]), nutrition is cut off, and a low form of inflammation is produced. Nerve-end degeneration takes place, endarteritis obliterans, and arteriosclerosis occur.

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*Read before the Section on Stomatology (A. M. A.), of which THE DENTAL SUMMARY is the representative organ for the dental profession by special arrangement with the Jour. Amer. Med. Assoc.

[1] Talbot, E. S.: Interstitial Gingivitis or So-Called Pyorrhea Alveolaris, Philadelphia S. S. White Dental Mfg. Co., 1899.

[2] Talbot, E. S.: Developmental Pathology, Boston, Richard G. Badger, 1912, chapter on the dental pulp.

Ziegler[3] says: "The causes of inflammation may lie either in mechanical, thermal, electrical or chemical influences, as well as in the influence of parasites. The common characteristic of all these injurious agencies is the production, in the first place, of a local tissue degeneration, which, when of a certain extent and intensity, is associated with disturbances of the circulation and of vascular secretion."

This exactly describes the condition found in the alveolar process. Stasis of blood in interstitial gingivitis is, then, due to mechanical irritation and possibly chemical changes in the blood.

Ziegler[3] again says: "Under the designation inflammation are grouped those pathological processes, consisting on the one hand of tissue degenerations and tissue proliferations, and on the other, pathological exudations from the blood vessels.

In this particular form of inflammation, tissue degeneration takes place. There is no pain, heat or swelling as observed in the other forms of inflammation.

When we consider the peculiar endotransitory nature of the alveolar process, degeneration of tissue is the natural result. At the senile period when the excretory organs are diminishing in activity and in disease, vital resistance is at its lowest ebb, metabolism is diminished, and degeneration and absorption of the alveolar process is in active operation. As age advances, the destruction of bone is a natural normal pathologic process.

The disturbances in circulation bring about tissue degeneration because the gingival border of bone is very thin, transitory and easily destroyed. The action of this mechanical irritation is to produce artery changes, nerve-end degeneration and absorption of bone about the arteries, called halisteresis. Stasis of blood may take place in a circumscribed area, or on the entire border of the alveolar process; or the apical end of one or more roots may be involved. This depends on the nature and quality of the irritant. The nature and severity of the irritation, stasis of blood and a lowered vitality of the patients will also determine the extent of the destruction of tissue, whether the irritation is located at the apical end of the root, midway between the apex and the cervical margin, or at the cervical margin.

When the inflammation has once become established at the cervical margin, the absorption is progressive to a greater or less extent until the tooth or teeth are removed. Owing to the transitory nature of the alveolar process when irritation and stasis of blood occur, the nutrition of the part is interfered with and the bone tissue may be partially or wholly destroyed, leaving the fibrous tissue (trabeculæ) undisturbed, thus holding the tooth firmly in position, although it can be moved laterally by the fingers. In most cases, however, the entire structure, including the fibrous tissue, is destroyed.

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3. Ziegler: General Pathology, p. 314.

My researches have shown that the deposits on the roots of the tooth, other than tartar, are the detritus of destroyed bone and not deposits from the blood, as was formerly supposed. The pus stage is an after-consideration, and has nothing to do with the disease.

In summing up the etiology, then, in this disease: *1.* We have to contend with the bone as an end-organ in which the blood accumulates (stasis). *2.* Stasis of blood cuts off nutrition. *3.* Local and constitutional irritation and chemical changes in the blood set up a low form of inflammation and bone absorption. *4.* The absorption is enhanced because of the transitory nature of the alveolar process. *5.* Nerve-end degeneration and arteriosclerosis occur. *6.* Want of vital resistance assists absorption.

LOCAL TREATMENT

The first symptom of interstitial gingivitis is bleeding of the gums, on the slightest injury. The classification of the different phases of the disease renders the treatment, so far as we are capable of directing it, simple and easy.

The first thing that naturally comes to the mind of the operator is to remove the cause. The local treatment may begin immediately. For personal reasons of cleanliness of the patient and the operator, one or two applications of iodin should first be made to the gums, which will destroy the germs and cleanse the mouth. After this has been accomplished, the removal of all local irritation may begin.

We have seen that stasis of blood cuts off nutrition, causing degeneration of tissue (absorption of bone). *The main object to be obtained in the treatment of this disease is to remove the stagnant blood, re-establish the metabolic process and cause a normal flow of fresh blood to nourish the parts.* The nutrition of the part must be renewed that nature may restore the tissues to health.

How shall this be accomplished? To remove congested blood, physicians, from fifty to a hundred years ago, resorted to cupping, leaches and scarifying the tissues. These methods must be resorted to at the present time in treating this disease. If the gums are congested and festoons hang down between the crowns of the teeth, they may be removed on a line with the alveolar border with a lance.

The gums should be allowed to bleed as freely as possible. In removing the deposits from the roots of the teeth, the parts may be injured as much as possible with as little pain to the patient as possible, the germs having first been destroyed. In this way much of the congested blood can be removed.

The suction process, not unlike the old method of cupping, is excellent when properly performed.

Scarifying the gums is also a good method of procedure. Vigorous gum massage with a stiff gum massage brush should now be employed to stimulate the tissues to healthy action.

Before the operation and after bleeding, iodin should frequently be employed to destory all germs in the mouth. All loose teeth should be removed.

The following preparation has been used since 1878:

Water	10 parts or grams.
Zinc iodid	25 parts or grams.
Iodin	25 parts or grams.
Glycerine	10 parts or grams.

The iodin destroys all germs in the mouth and cleanses the tissues. The zinc iodid is used to contract the tissues, the glycerine to assist absorption. This preparation is applied to the gums, teeth and mucous membrane by a long, slender applicator with cotton wound about the end. It should be applied as often as every other day if possible. It is not to be used by the patient.

Friction and stimulating methods must be employed by the vigorous use of a "gum massage brush." The brush should be so shaped that it will reach the festoons between all the teeth.

It should be made of the stiffest unbleached bristles that can be obtained. The brush should be inserted into the mouth, the mouth and teeth closed. In performing this operation the mind should be concentrated on the gums and not the teeth. When the tissues have become revitalized, deposits from the alveolar process on the roots of the teeth will cease to form.

One of the best gum washes for the patient to use in connection with "gum massage" is that of the zinc sulphocarbolate recommended by Dr. W. H. Whitslar, of Cleveland. This drug may be used in different strengths and in many forms. The following is a combination which I use:

GUM WASH

Zinc sulphocarbolate	60 grains
Alcohol	1 ounce
Distilled water	2 ounces
True oil of wintergreen	8 drops

The patient should use this gum wash and massage the gums three times a day. The patient should be under the care of the operator at least two or three times a week, so that he may direct the treatment. The treatment of interstitial gingivitis at the apical end of the roots must be carried out according to symptoms.

CONSTITUTIONAL TREATMENT

While the local treatment is being conducted, the patient's general health should be inquired into. A twenty-four hour sample of urine should be obtained, and a thorough laboratory examination made. If there are casts and high acidity, and idican is abundant, meat should be excluded, the patient placed on a vegetable diet, and the acidity reduced. The bowels should be kept open and large quantities of water consumed. There are many methods of cleaning the system and bowels. The following may be used to good effect; a teaspoonful in half a glass of warm water every four hours:

Calcined magnesia (heavy)	½ ounce
Sodium bicarbonate	1½ ounce

If the patient has sugar, albumin or other complications, it is best to refer the patient to a physician for general treatment.

By this method of treatment the patient, in the estimation of the average dentist, is cured; not, however, as other diseases of the body are cured. Eternal vigilance is necessary on the part of both operator and patient to prevent blood from again collecting in the blood vessels of the alveolar process, and a return of the disease.

The bone is still an endotransitory structure, and having once become diseased, it is much easier for the stasis of blood again to take place. As the patient advances in years, the excretory organs become senile, poisons collect in the blood, resistance is lowered, and there is a gradual absorption of bone taking place about the teeth throughout life.

31 North State Street.

DISCUSSION

ON PAPERS OF DRS. LESCOHIER, POTTER, RHEIN, HARRIS AND TALBOT

Dr. Arthur D. Black, Chicago: The first most outstanding feature of the pathology of this group of diseases, is their chronicity and this has possibly contributed much to the difficulty of a clear understanding of the pathology. This condition, which I will term a chronic suppurative pericementitis will, in the average case, be progressive extending over ten, fifteen or even thirty years. In those cases where we have a systemic cause as the principal one, we would naturally expect to find a general involvement of the peridental tissues. Except for some added local exciting cause, there is no reason why one or a few teeth should be picked out; all of the teeth should be included in the manifestation of the disease where the systemic condition is the principal cause. On the other hand, in those cases where a limited number of teeth are involved, we would naturally expect to find that the local exciting causes had played the primary role. As to the bacteriology: Many men have endeavored to find a specific organism which could be associated with this disease, and they have failed. One fact argues against a specific organism as being the cause, and that is the progress in these pockets, and this progress is very much more rapidly towards the apices than laterally around the roots. We observe many cases in which from an original pocket there have developed a number of other surface pockets, without any involvement of contiguous surfaces of the teeth. The tendency is for a tooth to move away from the side of the pocket, because encircling each tooth are the fibers of the peridental membrane. These are on a tension, and when the tissue is destroyed on one side of the root the balance of those fibers is lost, and the fibers of the opposite side draw the tooth in that direction, unless some obstruction of occlusion prevents this. There never is a detachment of the peridental membrane alongside the root that is not preceded by a gingivitis. In the destruction of the tissues about the root one of the earliest manifestations of the presence of a pocket alongside the root is a stripping off of these tissues from the cementum. As time passes there is left a connective tissue which has nothing which may differentiate it from a general connective tissue. Those elements which are necessary to a normal reattachment of tissue to the tooth are lost. What else has happened? The cementum has absorbed the products of that suppurative process. It has been changed from a positively chemotactic tissue into a negatively chemotactic tissue, which will repel tissue attachment.

As to rebuilding of the cementum: I have examined many cases and seen many in which there has been an absorption not only of the cementum but of a considerable portion of the dentin of the tooth, but I have never seen any where there was a detachment in that area. They were not infected cases; there had been no suppuration. They were not cases in which, if you leave the end of a root you will find cementum building over it. Dentin has no power of rebuilding cementum. Someone said it was closely compared to bone. It is, except that it has no circulation. Its life depends on the cementoblasts on its surface. No changes take place within it. As the pocket progresses farther down the side of the root, we must expect the first absorption of the alveolar process to take place near the crest, and then as it continues around the root, in cases of long standing we have a funnel formation in the bone. That is one of the marked symptoms of progress of this disease. I would like to criticise Dr. Potter's use of the term erosion in connection with these destructions or absorptions of the bone. It seems to me that the term rarefaction is hardly applicable to these cases, because the bone is either destroyed or absorbed. Dr. Potter spoke of looseness and tightness of some of these teeth. Many times we have a very loose tooth. so far as motion is concerned, and yet it is difficult to extract. As a result of inflammation, the fibers of the peridental membrane which remain attached to that tooth have lost their tonicity; they are not taut, and are apparently lengthened considerably, so that the tooth has an excessive motion, which does not at all compare with the amount of destruction of tissue which has occurred. Treatment will tone up those fibers and they will again exert their normal pull.

Dr. Floyd D. Leach, Chicago: There is a certain amount of tooth movement laterally, that is, from buccal to lingual. Dr. Black said something about a peculiar action of the microorganisms which caused a destruction of the investing tissues of the teeth, especially along the proximal surfaces of the roots. We have all seen this condition, causing the breaking down of the contents, due to the lateral motion in the act of mastication. It is not easy to guess or feel quite sure that those fibers of the peridental membrane which die to the buccal, labial and lingual sides of the sockets, should take the mechanical strain. I have an idea this condition may be the reason why the progress of the destruction is more pronounced on the proximal surfaces of the roots than on the buccal, labial and lingual. You have always noticed that the pockets are really on the interproximal surfaces, The gum would recede from the lingual, labial and buccal surfaces of the roots and still in a great many cases be very firm, as to attachment. Food substances constantly massaging these areas, and the friction of the brush where a brush is used in cleansing the gums and teeth, stimulate to a greater extent those areas on the buccal, labial and lingual surfaces. But I think the mechanical arrangement of the fibers adds more resistance, more tone, and more strength to these buccal, labial and lingual vestiges.

Dr. Russell W. Bunting, Ann Arbor, Mich.: We have been told by some that pyorrhea is the result largely of constitutional factors, and by others that pyorrhea is the result of local disturbance, such as infection and irritation. Almost all have agreed that very frequently there are combinations of these two. May I present this view of the situation? May we say that pyorrhea is caused by an exciting condition, such as the infection which destroys the tissues about the teeth and severs their attachment? But infection is not the determining cause. The determining factors are all the predisposing causes, either local or general, which make the characteristic action of the exciting causes possible I like Dr. Rhein's statement that healthy tissues can not be infected. How often have we seen ten times the local infection that would be necessary to produce pyorrhea existing in the mouth, and no pyorrhea present? Why? Because those tissues were so healthy that they were not infected, even under very untoward local conditions. If this is true, we must recognize not only the local but the general conditions as causative factors. As Dr. Rhein said, our constitutional factors are often so obscure that the ablest and most careful internist cannot detect where they are located, or what their nature is. The infective condition alone which is present in the mouth could not have produced the pyorrhea in such cases but for that remote constitutional condition which made it possible for this to happen. Fortunately, we find that very frequently the clearing up of the local causes usually allows the tissues to come back to an apparent normality.

Can we cure pyorrhea? I have taken the stand that we cannot cure pyorrhea unless we can obliterate the pockets. Dr. Harris said that the pocket may be obliterated because cementum is built on the denuded surface, and that new attachment is had to the tooth. Dr. Black does not believe that pyorrhetic teeth can ever have a reattachment. We must admit this, that if pyorrhea is to be cured absolutely, either the soft tissues must be reattached to the tooth completely up to the free line of the gum or else the gum line must be retracted down to the place on the root at which it is attached. If it is true that these tissues can never be reattached, why should we not treat pyorrhea by opening the pockets, cutting away all overlaying tissue, clear down to the bottom of the pockets, exposing the healthy tissue and allow it to heal? We would then have obliterated the pocket and the pyorrhea. But is that the only way in which it may be done? It is my conviction that the tissues may be made to physically join to the surface of the root after they have been denuded from it in the formation of a pyorrhea pocket, if the conditions are right. I have had many specific instances of pockets, in which I could get one quarter, one-half or three-quarters of the length of the root with an explorer, or any other instrument, and at the conclusion of a month or two of surgical treatment, assisting the tissues to return to as near the normal as possible, I have been unable to get the finest instrument between those soft tissues and the root of the tooth in the identical place where the pockets had existed previously. What has taken place in those pockets? Are there any other two tissues in the body that would so approximate and still not be physically attached? I do not think so. Let us take a surface view of that pocket. Pyorrhea seldom goes down circumferentially, attacking the tissues equally. It rather goes down one surface. If we prepare this root surgically and make it clean, we have remaining on either side living, healthy pericementum, which is capable of reproduction and filling in the space with new tissue. This is laid down first in the form of granulation tissue from which tissues may develop having the propensity to form a bony-like material, or even true bone, which may be deposited on the surface of the root, and attach those primitive fibers, or embryonic type of transitional tissue, to the surface of that root. When a root is resorbed there is in many cases entire breaking up of the fibers. The bone is entirely taken out at a given area and only a transitory type of tissue remains. Dr. Black said that in one case the destruction was not infective and that in the other it was. But was it not destroyed in both cases and what is the difference? There are cases on record in the literature in which a bone has been cut across; a section has been taken out, and in the gap there has been placed on an ivory bit that reproduced as nearly as possible the bone which was removed. Later that section has been removed and has been examined in microscopic section. It was found that the ivory had about it a layer of new bone which was quite like a lamellar bone placed on the outside of the ivory. Outside of the bony layer a soft tissue formed, quite like periosteum. These tissues had adapted themselves to form a direct attachment of soft tissue by a bone-forming process to the ivory, in which there was no circulation without which Dr. Black stated reattachment could not occur. We are told that exactly the same thing has been done with platinum in which bone has been laid on top of platinum, and the soft tissues glued to the platinum in the same manner.

Dr. Eugene S. Talbot, Chicago: I conceive an entirely different condition of things than has been explained to you by Dr. Black and Dr. Bunting in regard to pockets. There is no question about the pathology. It is all laid down in my work, and has been verified in a great many different methods of experimentation. My own researches explain that many of the statements made by Dr. Black and Dr. Bunting, are much more simple than the points brought out by them. For instance, arteries run through the alveolar process and the peridental membrane. When irritation takes place, whether local or constitutional, the artery is filled with irritation. If constitutional, it may be poison; if local, it may be anything that produces a local irritation. If you will examine the illustrations in my book, you will find that the bone extends around the artery. The irritation, then, is set up in and around the artery, and if there are a dozen arteries there are a dozen points of irritation, inflammation and absorption, and the absorption starts out from the artery. We will say that this irritation is due to lead or mercurial poison. That material is carried down into the artery, and it may extend clear to the end of the root. What has taken place? Absorption has taken place around that artery, and only one artery is involved. Absorption has gone down to the end of the root. But if the irritation is greater, either constitutional or local, these arteries passing in a lateral direction, as well as those passing longitudinally, may absorb the entire process on the one side of the tooth, while absorption has taken place downward in the other case clear to the end of the root in one or two arteries. To explain Mr. Bunting's point about filling up of the alveolar process with new material if the inflammation has extended down the side of the root, with one, two or three arteries involved, the bone is liable to heal up if the cause is removed. If, on the other hand, the bone has been entirely destroyed downward and pockets have been formed, that bone is never restored, because the fibrous tissue is entirely lost. Bone absorption takes place by halisteresis before the fibers of the peridental membrane are destroyed—just the reverse of Dr. Black's idea.

Dr. Meyer L. Rhein, New York: Not a thing has been said in regard to cemental repair that can be denied under certain conditions, and yet we have listened to statements that appear to be absolutely in opposition to each other. I know that Dr. Bunting is correct in what he has said. I know that exposed cementum can be repaired and the normal condition replaced, but each of the speakers has omitted to state in what conditions repair, or lack of repair, takes place. Dr. Talbot gave a very lucid description of what takes place in the tissue when arteriosclerotic conditions manifest themselves. We get these conditions in certain forms approaching the period of senility, in certain forms of malnutrition, nephritic and diabetic conditions, and under such conditions as that repair of the kind that Dr. Bunting spoke of is impossible. Why does a pocket form? We get a pocket on account of imperfect nutrition to that particular spot, and as a consequence there is the impossibility of repair which must ordinarily take place throughout the body daily. The same conditions that produce pyorrheal conditions are at work in erosion, where there is found a continuing loss of gum tissue, exposing the root surface, except that the local resistance, due to many causes, has prevented infection from taking place. In other words, in the retraction of the gum which results in the exposure of considerable of the root surface of the teeth, we meet with the same lack of nutrition that is demanded at every ultimate point of nutritional circulation. Pyorrhea may occur in people suffering from fatty degeneration about the heart. What are the appearances of the mouth in this condition? There is no suppuration. There is no deposit on the roots, but very extensive pockets, that frequently go down deep and we find the gum in ribbons over these pockets. They are great big flabby pockets with a deterioration in color and character of the circulation. I have never seen one with any purulent condition. I have seen those gums come back absolutely to what we would consider comparatively healthy gum tissue under the Nauheim treatment. If the malnutritional factor has disappeared after treatment, you may call that case cured. What is the reason that exposed cementum, considering that there is no condition of malnutrition present, will not permit the tissues to recover? It is due to the fact of exposure of this cemental surface to the irritating fluids that are in circulation. I believe it will take exceptional conditions to permit a cemental surface that has suffered abrasion to repair, because of the danger of retrograde metamorphosis going on from its exposure to the fluids of the mouth, consequently the therapy must be of such a mechanical nature so to cover that cementum that it will not be exposed to the fluids of the mouth. I have done this for many years by coating the surface of such cementum with chloropercha, keeping the exposed cementum hermetically sealed and thus protecting it from the fluids of the mouth.

Dr. George B. Harris, Detroit: I have been misunderstood a little in regard to the regeneration of cementum. In the first place, I do not wish to be understood as saying a complete regeneration takes place. The point I wanted to bring out is this, that there are cases where the cementum has regenerated, and these cases were not under aseptic conditions. Can anybody imagine the crown of a tooth cut off below the gingival margins or split half the length of the root with the cementum forming over it, and say that this portion was in an aseptic condition? I do not believe it. Further, where the cementum is diseased we can remove it, leave nothing but the healthy cementum below, producing a condition that is as near aseptic as it is possible to get under the conditions, a condition at least equal to those mentioned where the cementum did reform. It is possible, then, that the cementum will reform there. Whether it ever has or not, I do not know, because there is no way of measuring it as it takes place in the mouth, unless you would happen to find a tooth where the difference in density of the cementum will show, or where it would be shown by the new cementum making a thicker coating.

Dr. G. H. Smith, Medina, Ohio: This subject of pyorrhea has been of intense interest to me for five years, and I would like to suggest to the medical profession that they advise more of their patients to select an ethical dentist. Dr. Moorehead made a statement in his address that I can hardly substantiate. He claims that only ten per cent. of the dentists were efficient. There are dentists commercializing, but with the co-operation and advice of the medical profession, many patients would escape many dental disorders.

Dr. William C. Fisher, New York: I want to ask Dr. Rhein if I understood him to say that in a diabetic patient he would not consider operative procedure as being wise? That it had been known to even be fatal?

Dr. Rhein: Correct. I said diabetes not under control.

Dr. Fisher: I am not thoroughly convinced that a dental operation is precluded in any patient—diabetic or otherwise—who is able to visit your office and go about his business. I believe, of course, in the medical treatment, but I certainly think that there is absolutely no shock, such as that experienced in a major operation, while treating these cases. In pyorrhea I use the several solutions of iodin. Dr. Talbot spoke of gum massage with the brush. Do you mean the hand or engine brush?

Dr. Talbot: The hand brush.

Dr. Fisher: I was afraid that possibly you meant the engine brush. In polishing teeth we want to get away from anything that will in any manner injure or tear the tissues, and I have devised a simple little mandril of one piece of steel. I use French tubing of different sizes to fit; and make my polishing powder, mixing in with that iodin. As this mandril revolves in the engine, the French tubing will flare out on the surface and coax up the gum, whether receded or not, and polish the surface beneath the gingiva. In the interproximal spaces select a smaller piece of tubing, and it is possible to get a polished surface there. With that method you get a massaging of the gum which the patient cannot possibly give it. You are massaging the gum at the same time that you are polishing the neck of the tooth where it has been scaled.

Dr. W. A. Price, Cleveland: Two decades find us almost exactly where we were when I started to practice dentistry twenty-three years ago. We cannot come together and express a common idea relative to the etiology of pyorrhea and be united in supporting and substantiating it. We have made practically no study whatever of protein absorption, which takes place around these pyorrheal infections. A large number of nervous lesions of the body have apparently been traced directly to dental infections and to pyorrhea. The medical profession must bring these patients back to us for treatment, and we cannot even give the A. B. C. of the infection in pyorrhea. We do not know the nature or the morphology of fifty per cent. of the bacteria that grow in pyorrhea pockets. They have not been grown artificailly. What is the solution? If I were to ask Dr. Talbot how he got his information, that has been the great cornerstone for a large part of this work., he would say, "hours and hours, and days and days, and years and years of hard work." How many men are devoting a worthy effort to this work? We are called on to redouble our efforts to answer with some degree of intelligence this great question of the etiology of pyorrhea, which today we know almost nothing about.

Dr. Hollis E. Potter, Chicago: I can see now that the pockets we are showing with the Roentgen-rays represent more absorption of bone than any such slight detachment as you have been talking about. I should think that in cases where we are showing Roentgen-ray findings of absorption around a tooth, when we are talking about a pocket, it is a very gross condition as compared with the small and limited pockets that the controversy is about this afternoon.

Dr. Alexander Wm. Lesochier; Detroit: As Dr. Price said, it is possible that there are many good things we do not know about the bacteriology of pyorrhea, but there is one fact which I do not believe has been established, namely, the preponderance of streptococcic infection. I do not mean to imply that the streptococcus is the cause of pyorrhea, bacterial infection being apparently a secondary element, characteristic of the pustular stage and not of the initial condition. But in view of its potential virulence and the persistency with which the streptococcus is found, it is indicated that certain strains have a peculiar affinity for the peridental tissues. Also that as far as the sequelae of pyorrheal infection are concerned, particularly the arthritic, the streptococcus overshadows in importance other micro-organisms.

Dr. H. A. Potts, Chicago: May I ask if it has been determined whether or not this streptococcus which he finds in pyorrhea is an aerobic or an anaerobic one; whether hemolytic or the *Streptococcus viridans*, and what connection there is between the effects of these streptococci of pyorrheal infection and those found in chronic abscess?

Dr. Lescohier: I cannot answer definitely the questions raised. The work of Hartzell and others has indicated that the viridans is found much more frequently than any other type, but hemolytic streptococci are also observed in some cases. I would not undertake to answer the question as to the relationship between streptococci elsewhere and those in pyorrhea and alveolar abscess.

Dr. Meyer L. Rhein, New York: I do not want to let the inference go that I am oblivious to the fact that it is necessary to have an attacking organism when we come to this stage of infection. There seems to be a strong elective affinity of certain micro-organisms to attack the gingival tissue dependent on certain malnutritional predisposing causes. There is a type of pyorrhea due to certain kinds of malnutritional causes, where the attacking organism is a protozoon.I have cured three distinct cases of pyorrhea in the last two years with emetin, and I failed in numerous other cases. Now, why should this be? It simply carries out in the ultimate analysis what Dr. Lescohier's paper has shown us, that there is no one specific organism in pyorrhea. The three cases I cured all seemed to have the same kind of malnutritional predisposing causes; they were all cases of intense inflammation and infective conditions in the larger colon. They were cases that had shown symptoms that very closely resembled epidemic forms of dysentery. Now, is it illogical, is it surprising, that in a condition of that kind, where we know the endameba plays the role of attacking force, that when by reason of this predisposing cause the mouth shows the evidence or pyorrhea, we should find the same organism again the attacking force? The place to find pyorrhea is not among the patients who come to the office of the dentist. You will find pyorrhea almost everywhere. About eighty-five per cent. of the cases that the average dentist treats as pyorrhea are nothing more than some focal infection that has been diagnosed improperly and in which a Roentgenogram would demonstrate the error of the diagnosis. In chronic alveolar abscess, with its sinus opening out into the mouth, sooner or later symptoms appear that approach and grossly deceive the careless diagnostician, and there is no reason why you cannot get an alveolar abscess with a pyorrhea complication, if you want to call it such, that is dependent entirely on the apical infection. I have found such a condition in a considerable number of cases. On careful differential diagnosis I could put my hands on the point of focal infection. That is especially true in cases where there seem to be one or two teeth only subject to pyorrhea. When an individual presents with a pyorrhea in one or two teeth, the diagnosis is open to grave suspicion. I have found the focal infection of a pyorrhea showing in an upper incisor, away back in the roots of a second molar, and I recall quite well the difficulty in making a diagnosis in that particular case. I was a little surprised at Dr Fischer's question as though I was in doubt as to whether operative interference was to be avoided in diabetics where the diabetes was not under control. It is not a question of a major operation that makes a surgical condition a most dangerous proposition under such conditions. I know of no surgeon who would not seriously hesitate to do the most minor surgical operation on a patient showing a large percentage of sugar. It is true that under certain conditions, when it becomes a question of life or death, the surgeon will take chances. He knows the patient is going to die from septic causes, and he is going to give that patient the benefit of that chance. The deaths from teeth extraction in diabetics would fill a very large chapter if they could be brought together.

Dr. Fisher: Does that mean from the anesthetic?

Dr. Rhein: No. I am simply stating what is an abstract fact that is settled in the minds of surgeons, pathologists and bacteriologists at the present time. In regard to research work: We have had to have recourse to animal experimentation to a large extent, and I am convinced that all the dental research work on animals in the past is replete with error, because the mouth flora of the dog is so different from the mouth flora of the human that it cannot consistently be taken as the same in any experimental work on animals. This is a very important factor, and it is far better for dental research work to proceed slowly and get results that are not going to be questioned in the future than to make comparisons and arrive at conclusions that cannot be verified.

Dr. Eugene S. Talbot, Chicago: If you will examine the dental journals, and some of the medical journals, you will find that a large percentage of the pictures that have been shown are represented as abscesses. Dr. Potter has shown us that there are a great many different shades or conditions of the alveolar process which are not abscesses, and the reason for that is that we have a condition of absorption called halisteresis, and not lacunar absorption in the alveolar process, which may be or is due to the irritation that has taken place from the pulp chamber. The degree of absorption will depend on the amount of irritation. In regard to focal infection, the dental profession can hardly be blamed for abscesses at the roots of the teeth after the canals have been treated and filled. Up to within the last two or three years, when an abscess formed on the root of a tooth and the face swelled or a fistula had formed, the only means of knowing that the abscess was supposed to be cured was that the face became reduced to a normal state and remained so; the fistula healed and did not return. These were the only symptoms available when the tooth remained quiet without pain or swelling, which led the operator to believe that the abscess was cured. With the modern methods of diagnosis, the Roentgen-ray, we have learned that these signs are not for a moment to be considered. The Roentgen-ray demonstrates that very few abscesses are destroyed and healed, but that they remain cold or blind abscesses, discharging pus into the tissues for an indefinite length of time. I recall one instance in which an abscess remained on the root of a left superior first molar for fifty-two years.

THE TREND OF DENTISTRY TOWARDS GOVERNMENTAL HEALTH BUREAUS

BY BERNARD FELDMAN, D.D.S., PERTH AMBOY, N. J.

WE ARE LIVING in an age of efficiency. A careful study is being made in every line of endeavor to get the maximum results out of co-ordinated effort. The members of the healing professions have also become imbued with this spirit of progress. It is logical that the ideal of prevention should play so important a part in the attainment of efficiency; and where Big Business had adapted the motto, "Safety First," the healing professions are using "Prevent Rather Than Cure."

It may prove interesting to make a brief study of the conditions confronting dentistry today, because, as Dr. Mayo has so aptly said, the next step in preventive medicine must be taken by the dental profession. This statement becomes of momentous importance when given the serious consideration which it deserves. Upon dentistry has been placed a tremendous responsibility. It is the purpose of this discourse to discuss this matter, and to suggest a plan whereby dentistry shall be able most effectively to shoulder this responsibility, and to most efficiently produce the maximum results in its duty of preventing disease for future generations.

The mouth *is* the battle ground, wherein is to be fought the greatest war of the future, the war to *prevent disease*. It is no idle fancy, but an indisputable fact that most sickness can be traced to the germs which are allowed to flourish in an unclean mouth. It is not necessary to repeat that all the factors which are necessary for the incubation and growth of disease germs are furnished in the mouth. This is not the *only* entrance for infection, but undoubtedly it is the most important. The mouth, therefore, becomes the greatest battle ground in the fight for disease prevention. A clean mouth, which is efficiently cleansed daily, will become the greatest safeguard to good health. The problem, then, of keeping the mouth clean, resolves itself into three factors, viz.:

1. Establishing a routine which shall really clean the teeth and benefit the mouth.

2. Enthusing the public to actually carry out this routine *at home*, regularly and conscientiously.

3. Organizing the dental profession into an efficient Health Service, an organization which may most efficiently cope with the repairing of lost tooth structures, with the careful guarding of the mouth by twice-a-year examination and cleaning, and with the enthusing of the public by education to co-operate faithfully.

We will eliminate the first two and confine our discussion to the third factor, dealing with organization. Our present system permits a raw recruit, with a high-school diploma or its equivalent in Regent's counts, to enter the dental profession, by entering a dental college. For the following four years an honest effort is made to mold this raw product into a finished article. Upon his graduation the doctor is given a State Board examination, which permits him to practice immediately upon an unsuspecting public in his own state; yet he is forbidden to practice in any other state because of legal red tape. We know that it will take this raw product from five to ten years of constant clinical experience to be able to practice dentistry as our leaders would like to see it practiced. The doctor is plunged into the maelstrom of professional life, and it soon becomes a struggle to survive amongst the fittest.

The young doctor is bound by a code of ethics which some people are beginning to consider as being unfair and unethical itself. The fact remains that dental service is being sold to the public for *money*, which will buy the necessities and comforts of life. It is the exceptional man who does not chase the almighty dollar, and each dentist uses a different method to influence the buying public into his chair. Some of the methods employed are ingeniously clever, and whether the method employed is ethical or unethical is immaterial; the *motive* is the same, to try to get the most patronage. One dentist offers cheap prices as *his* inducement; others follow, until dental services are in some cases being sold in the same manner as groceries. Another uses printer's ink, paying for such publicity at least openly and honorably. Some men criticise any form of newspaper publicity, yet are mentioned frequently enough in *free* newspaper space to create a favorable impression in the eyes of the public. College professors who are in active practice, officers of dental societies and specialists, etc., do not realize it perhaps, but they are creating *their* favorable impression which makes people flock to them for their services.

The young doctor must compete with the unscrupulous advertiser on the one hand, and the old experienced ethical campaigner on the other. Ethics forbids him to resort to the former's methods as a means of competition, and but few parliamentarians ever climb to the top and enter the charmed circle as society officers, etc. It requires years of activity in the societies and of political diplomacy while they are climbing. The code insists that he must uphold the dignity of the profession, first, last and all the time. The earning of a living and the providing of bread and butter is an after-thought. The young doctor finds out quickly enough that for more money he is interested to perform *better* service, and that the amount of money he is clever enough to "contract" out of a patient, influences the quality of his service. It is getting to be so that "Heaven pity the poor."

As long as this era of competition continues, it is useless to expect that true ethics will exist in the professions. Money has too strong a grip on this world and rules it too completely. Before we can expect true ethics to be practiced (Oh, it is preached enough) amongst physicians and dentists, we must remove them from this moneyed influence, by enlisting them in a governmental service, as are the members of the medical and dental corps of the United States Army.

Good health has not been given to humanity in order that a money-making business or profession should be made out of the sicknesses and misery of the sick. Health is a God-given thing, and it is the government's first duty to its people to preserve and protect good health. This question of *good health* should take precedence over *all* other matters, no matter how vital they may be to the public welfare. For instance, if we had to choose between an educated sickly child and a healthy uneducated one, let us make certain of the child's good health *first*. Its education can come later.

That there is a definite trend towards the ultimate establishment of such a health service is best evidenced by the following advance steps which are now in existence.

1. A definite propaganda has been started by dentists for a National Board of Dental Examiners, which aims to standardize such tests and to permit the successful applicant to practice in any state in the Union. Dr. Kirk has recently written an editorial showing the many faults of the present system of state board examinations.

2. Dr. Fones has proved to everyone's satisfaction that the cleaning of school children's teeth by dental nurses regularly in the public schools of Bridgeport, Conn., has resulted in great benefits to the youngsters. This great advance step in preventive dentistry should be followed by many other cities.

3. The task of guarding the mouths of one hundred millions of people is far too great for the fifty thousand dentists who are being kept so busy

repairing teeth that they find little if any time to clean teeth. So the state of New York has made another advance step by *licensing* dental nurses in order *to assist* in the campaign for disease prevention.

4. It has been demonstrated that poor people cannot afford to pay for the most necessary forms of dental service. As a result, *free dispensaries* are being furnished by the most progressive cities to take care of the dental needs of the poor. These clinics are springing up everywhere from Maine to California.

5. Impressed with the wonderful possibilities which such institutions could have on the children of Rochester and Boston, Mr. Eastman, of Rochester, and the Forsyth brothers, of Boston, have established *free dental services for the children* of these cities in splendid institutions costing millions of dollars. Why cannot municipalities *legalize appropriations* which will give *their* children similar benefits?

6. In many large industries, the employers are furnishing *free* dental service at their plants for their employes.

7. State authorities are furnishing *free* service in various penal and other state institutions. Interesting data has been furnished by Dr. Keyes, of Boston, in which he proved that no other agent than his careful attention to keeping clean the mouths of the children of an orphan asylum was responsible for the total absence of sickness in that institution for three consecutive years. It has aroused wide-spread comment. It proves that *mouth hygiene does prevent disease.*

8. Cities are spreading the truths of general hygiene by free lectures, by bulletins, etc., and by employing *free nurses* to go into the homes of those people who cannot be reached otherwise to become interested. It is a very effective way of teaching the gospel of healthful living where it is most needed.

9. The U. S. government has efficient Army and Navy Medical and Dental Corps, which have done much good for the soldier and sailor. A system which is good for seventy or one hundred thousand soldiers and sailors could be extended to serve one hundred times as many people. We thus have in this country a Health Service in actual operation; the writer merely suggests that it be extended to serve *all* people. Such an extension has in fact already taken place, in part at least, and our Indian wards have been the lucky ones to be the first to receive such health service.

Just when such a Government Health Service may be established which shall take care of all people, is a matter of conjecture, but the writer hopes that it will be hastened by this discourse. Health congresses and national mouth hygiene associations are doing a little to make things better. All credit is due to the ardent idealists who are helping them along. Yet, tooth decay will not be stopped until more effective means than these are employed. Even with such a thoroughly organized army of governmental physicians and dentists, such as the writer is now advocating, it will take years and years of determined effort to make an appreciable improvement towards the prevention of disease. How much less chance have less efficient organizations to produce maximum results?

Young men and women wishing to enlist in the Governmental Health Service will have to receive a preliminary training which will really prepare them for the special department of the healing art which they desire to enter.

Each specialty of the healing art has become very complex and it will tax the ingenuity of man for centuries to master each one. Medicine has become a profession of specialists, and the government will train its applicants to specialize and to concentrate on one of the many subdivisions of medicine.

Before employing these applicants, the government will give them rigid tests to assure the service of none but efficient practitioners. They will then be paid a certain salary, commensurate with the services to be rendered, which will amply provide for them and for those dependent on them. This will eliminate at once every form of unfair competition by making it impossible for money to influence the quality of the service.

Doctors will be pledged to serve the people to the best of their ability, and they will be assisted in this resolve by the government. Splendidly equipped hospitals, embodying every feature of medical science will be furnished. These buildings will be so placed—in size and number—as to meet demands which the community will place upon them. Rich and poor alike will receive the same *free* treatment. Restorations of gold and porcelain will be made at cost. Everyone, regardless of creed or station, will receive the very best quality of service which the bureau can suggest and offer. The very idea of a financial remuneration will be considered a sacrilege to the sanctity of the service. The spirit of service will be encouraged by the government. Special prizes will be offered for new ideas and for new thoughts that will aid humanity. Years of faithful service are to be rewarded by promotion in rank and increase in pay; this will be the only chance for money to influence the service, but such influence cannot do any harm, but will stimulate research work. Meetings will be held often to discuss the various topics pertaining to the science.

Whatever funds will be necessary for the maintenance of the municipal health bureaus will be supplied by the tax-paying public, much in the same manner as the system of postoffices, schools, etc., are now being conducted. It will be a co-operative service, and will aim to give maximum results at a minimum cost.

By a gradual process of evolution, the medical service will become preventive in nature. In fact, anything which has any bearing on the public health will receive this same thorough supervision by the government. Homes are to be built according to rigid requirements and streets are to be laid out with care and foresight, much like German cities were planned. Special study will be given to the proper disposal of waste, garbage and sewage. Drugs are to be obtained at the bureau only upon prescription by a government doctor, whether it be for a headache or for a serious ailment. No drug will be permitted to be used until it shall have been sanctioned by the National Committee of Investigation of Drugs.

Pamphlets and literature, giving necessary information to the public, are to be freely distributed by the doctors to assist them in their efforts to prevent disease. Regular medical examination will be arranged for; this is to be compulsory, but the person will be anxious to keep his twice-a-year appointment, because his enthusiasm will have been aroused to assist the preventive idea. Food stuffs of every kind are to be inspected and distributed under government control. An unceasing war will be carried on against germ-carrying pests. Consumptives are to be given the best of care in the best of sanatoriums; the same principle of isolation and good care will be carried out in other sicknesses.

The dental department of the governmental health service will be divided into two general branches. The first branch will deal with the school child and the second with the adult. In every schoolhouse throughout the nation there will be a dental dispensary, efficiently equipped to take care of all the school children, and enough prophylactic nurses will be employed under the supervision of the government dentists. Each child will have to have its teeth cleaned regularly, at least twice a year, by the nurse, who will report to the dentist any decayed teeth which she may find.

This preventive service will be the main feature of the Prophylactic Department. All children who are reported to be in need of fillings and other restorative service will be taken care of by the government dentists in each school dental clinic. A special department will be devoted to the straightening of crooked teeth and the correcting of malformed jaws. Decayed teeth will be filled, useless roots extracted and the mouth of every child will be rendered clean and wholesome.

A special effort is to be made to prevent the pulps or nerves of the teeth from becoming involved, to preserve their natural cusps and bodies, and to maintain their natural brilliancy and whiteness.

Such a regular and systematic care of children forms the hub of the campaign for disease prevention. The mouth is the portal of entry of numerous germs, and mouth cleanliness therefore becomes a most potent weapon for disease prevention. The school children can be easily induced to find these cleanings so pleasant that they will enthusiastically co-operate with the doctors and nurses.

The second branch of the dental service will aim to take care of the adult. Upon leaving the public school and regularly thereafter, the children's cleaning and repairing of teeth are to be performed in the Municipal Health Bureaus. The dental clinics will be equipped with the very best instruments, and the public will be given the benefit of the highest type of dental service, regardless of cost, creed and nationality.

This will be public Health Service in its highest ethical ideal.

PROFESSIONAL ETHICS OR OUR DUTY AS DENTISTS*

BY DR. C. E. HARPER, DANVILLE, VA.

ETHICS is defined to be the doctrine of morality, or social manners, which teaches men their duty and the reason of it. With the above definition, I will divide my subject into three parts:

First: Our duty or ethical relation to ourselves;

Second: Our duty from a professional point of view to our patients;

Third Our duty to our fellow practitioner.

Generally we have considered this question only from the last point of view, namely, our duty to our fellow practitioner. This is no doubt very important, but does not embrace the whole subject. If we do not perform our duty with respect to ourselves and to our patients, we will not do our whole duty to our fellow practitioner. To consider the first point, let us ask what is our duty to ourselves as individuals? We should at all times be careful about our bodies, both as to our moral and physical condition.

If ethics teaches us the doctrine of morality and social manners, who needs these qualifications more than a dentist? The close relation that exists each day between members of our profession and our patients, demands of us the very best social manners and morality. I claim that we are not acting in accordance with the common principles of morality, much less practicing strict professional ethics, if we undertake to operate under the influence of intoxicants, narcotics or drugs of any kind, thus impairing our best efforts of head and hand.

Our manners at all times should be the best, and while we are often worn out with the exasperating experiences that our profession demands of us, we should never forget to be gentlemen at all times, and by our appearance and conversation ever strive to do a little better each day.

Patients will often do and say things to us that we must overlook and meet with gentlemanly replies, remembering that we are professional men. And though at times it is hard to bear, it is better to suffer in silence than to reply or act in a manner we will later regret, remembering that "He that is slow to anger is better than the mighty; and he that ruleth his spirit than he that taketh a city."

The essence of the above is beautifully and tersely expressed in lines from Hamlet:

"To thine own self be true;
And it must follow, as night the day,
Thou canst not then be false to any man."

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*Read before the Virginia State Dental Society, October, 1916.

Thus we turn very naturally from the consideration of the dentist's duty to himself to that of his relation to his patients. We should ever be ready to respond to a call to relieve suffering, not stopping to consider the question of financial returns. We should at all times do what is best for our patients, not considering ourselves. Our advice should always be what is best for them, and if they fail to comply it is in most cases best to refrain from doing their work.

When a patient asks to have a tooth extracted, when in our judgment it should not be done, it is not far short of mal-practice to do it, simply because *he requests it.* We cannot ethically do it and then put the blame in after life upon his shoulders.

How often have we had patients when asked why they had lost certain teeth, to say, "The tooth ached and I asked the dentist to extract it," and add: "He ought not to have done it; he ought to have known better than I."

I remember on one occasion a young girl asked me to extract a lower bicuspid which was perfectly sound. I, of course, refused, and a short time later she returned and requested me to extract an upper third molar, which I did, and which proved to be the offending member. She remarked that the bicuspid had not ached since I told her there was no reason for it to trouble her.

How often do we attempt to save teeth principally for our own glory, when for the best interest of the patient the tooth should be removed?

While great good is being done in treating pyorrhea, and many teeth are being saved and rendered serviceable, and patients' health greatly benefited, I cannot help thinking that in some of the very advanced stages it would be much better for the patient if these teeth were removed. I believe there have been many patients on the verge of a nervous breakdown from the presence of these teeth, their minds being continually on them, being unable to properly masticate their food, thus bringing on indigestion and all of its awful consequences.

While I believe much good can be done in a great many cases, I do not believe it wise to try to save teeth in the advanced stages. The same can be said of chronic alveolar abscesses, which are better out of the mouth than in it. In the distant past teeth were ruthlessly sacrificed; it was almost the universal custom to extract teeth that had ached. Then as we progressed we commenced to save teeth more and more—until we reached a point where nearly all teeth were saved, not always to the best interest of the patient. Then the pendulum swung far back to the other side, and we heard of blind abscesses and foci of infection, and teeth that had given good service for years were doomed under the X-ray to the forceps, and physicians were ordering wholesale extractions, and it commenced to look as if there was no place for a dental surgeon, but only for extractors or tooth-pullers.

I suggested not long ago to a physician that I thought we had better extract teeth as fast as they were erupted, and we would have no more rheumatism, joint trouble, heart disease, appendicitis, etc., as nearly all diseases that man is heir to are being traced to the teeth. If we could raise a toothless generation we would have no more sickness and probably death would be a thing unknown. The physician then remarked that the people would then die of indigestion. So there you are. "You are damned if you do and damned if you don't."

Dr. Kirk, in an editorial in the July *Cosmos*, headed, "The Swing of the Pendulum," says: "In medicine and surgery the same tendency to faddism and over-enthusiasm is abundantly evidenced."

The vermiform appendix, the coccyx, tonsils, ovaries and various other human appurtenances, have been severally condemned to extirpation as the cause of the long list of human ailments, but as the result of these practical explorations into the realm of the unknown and theoretical have been ultimately harvested in terms of human experience, the conclusion has been uniformly reached that to none of these occasionally offending members can be ascribed all the ills that flesh is heir to.

Just now the human teeth are receiving their full share of attention, and some are finding in dental infections the solution of all etiological problems. "Teeth cause rheumatism, my doctor tells me," is the reflex of this later fad in the mind of the layman, and if the doctor says so, teeth must go like their criminal predecessors, the coccyx, vermiform appendix, ovaries and tonsils. Nobody who knows anything about the matter doubts the fact that some infections about the teeth cause some infection in other parts of the body; but we, the dental profession and the public, are menaced by the ill-advised urgency of the partially-educated among physicians who, having learned that teeth are upon occasions sources of bodily infection, therefore order extraction of teeth as a routine procedure, just as the same type of practitioner condemns to extirpation the superfluous organs already instanced.

As a first principle, it should be laid down as one of the fundamental articles of the professional ethical code that the question of the removal or retention of a tooth *is a dental question*, and one to be decided ultimately *by the dentist and not by the physician.*

Dr. Kirk concludes his article with these words: "It is therefore, in our judgment, high time that an active propaganda of sanity and well-balanced judgment with respect to this situation be undertaken and effectively carried out, so that as soon as possible we may arrive at that reasonable and normal mode of practice in these cases which is sure to obtain when the faddists and extremists have burned out their hyper-enthusiasm regarding focal infection."

I know I am treading on dangerous ground when I say that in the practice of orthodontia there are some cases where considering the best interest of the patient, it is best to extract one or more teeth, rather than to carry the patient through long weary years of correction, and at great expense.

In the past, extraction was recommended, but at the present time orthodontists generally say extraction should never be resorted to; but I believe a middle ground will be found and extraction in certain cases will be advised. Dr. Case, in August *Cosmos*, advises extraction of first bicuspids in certain cases of protrusion of the upper jaw.

I believe also in bridge work; yet if the best interests of our patients were considered there would be fewer bridges and more plates. I cannot believe it is for our patients' best interests to insert a bridge where, as is often the case, it is necessary to use loose teeth for abutments.

A great deal more might be said along this line of our ethical relation to our patients or the public, as we come in daily contact with them, but I will close this part of my discussion with a quotation from the tenth chapter of St. Luke, where a lawyer asked Christ who was his neighbor, and Jesus answering said: "A certain man went down from Jerusalem to Jericho and fell among thieves who stripped him of his raiment, and wounded him, and departed, leaving him half dead; and by chance there came down a certain priest that way and when he saw him he passed by on the other side. And likewise a Levite, when he was at the place, came and looked on him, and passed by on the other side. But a certain Samaritan, as he journeyed came where he was, and when he saw him he had compassion on him and went to him and bound up his wounds, pouring in oil and myrrh, and set him on his own beast, and brought him to an inn, and took care of him. Which now, of these three, thinkest thou, was neighbor unto him that fell among the thieves?' And he said, 'He that shewed mercy on him.' Then said Jesus unto him, 'Go and do thou likewise.'"

I believe it is our duty to do as did the Samaritan, to relieve suffering at all times, not stopping to consider the financial returns.

Now, the third and last head, and the one most generally considered, namely, our ethical relation to our fellow practitioner. I am happy to say today there is not that feeling of jealously existing between the dentists of the cities as there was in former years, and I believe this has been brought about by our local societies where we meet together in social intercourse, exchanging views on daily practice, getting rid of the old custom of keeping things to ourselves, but willing to exchange views with one another, to the betterment of all concerned.

We should ever be ready to assist our fellow practitioner in every way possible. During sickness or absence from city, it is our duty when called on by any of his patients, to render any service possible, remembering that we are not doing it for the patient, but for our brother dentist, and then refer the patient back to his own dentist.

We should never make promises impossible of fulfillment, or claim to do something peculiar to ourselves; in short, we should at all times observe the Golden Rule.

A dentist under no circumstances should advertise either by card or newspapers any special methods he may claim to have. And while I am and have always been opposed to any and all forms of personal advertising, I do believe, however, very strongly in dentistry as a profession being advertised. We do not do enough of it. Our state meetings are scarcely noticed in the papers, and I believe we should be up and doing in this particular, and see that more is said about our meetings in the daily papers, and advertise dentistry, what it is doing and hopes to do. I am firmly of the opinion that this lack of advertising our profession as a whole is somewhat responsible for the individual advertising.

We should be very careful about criticising our fellow practitioners and never in the presence of our patients. If we cannot say a good word about him it is best to remain silent, remembering Christ's words: "Judge not that ye be not judged, for with what judgment ye judge ye shall be judged, and with what measure ye mete it shall be measured to you again. And why beholdest thou the mote that is in thy brother's eye, but considerest not the beam that is in thine own eye? Or how wilt thou say to thy brother, 'Let me pull out the mote out of thine eye;' and behold, a beam is in thine own eye? Thou hypocrite, first cast out the beam out of thine own eye, and then shalt thou see clearly to cast out the mote out of thy brother's eye."

I have tried in this short paper to tell a few things we should do and should not do. And I believe if we could carry out all the things I have mentioned we would all be more ethical in our relation to ourselves, to our patients and to each other, and dentistry would be placed on a higher plane, where it rightly belongs, and we one and all would be proud of our profession, what it is doing and hopes to do for the relief of humanity.

HANDLING EMERGENCIES UNDER ANESTHESIA AND ANALGESIA*

BY N. T. YAGER, D.D.S., LOUISVILLE, KY.

IN CONSIDERING this subject, I am forced by experience to do so from the viewpoint of a dental anesthetist, as I have had no experience in the administration of an anesthetic for a major operation or other operations which would necessitate a prolonged anesthesia.

In my experience I do not think I ever have administered an anesthetic for a continuous period of over forty minutes. While it may be true the same remedies may apply in surgery, I can only speak from my own experiences in dentistry.

To my mind, if there is one person in the world who should be a *dyed-in-the-wool disciple of preparedness*, that person is the anesthetist.

A sign that I have seen lately has attracted my attention, and I should advise all anesthetists to at least make a mental drawing and let it ever stand before him: "Watch—Safety First." The unexpected so frequently happens that one should ever be on his guard, and when an emergency arises be prepared to act. After an accident is a very poor time to seek a remedy. The emergencies with which we have to deal are of such a nature that our notice is rather short, and the time to act is now.

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*Read during the Joint-Session of the Interstate Association of Anesthetists and the National Dental Association at Louisville, Ky., July, 1916.

To me it seems that the experienced anesthetist has a sixth sense, which is demonstrated by the fact that time and time again there has been an approaching or threatened trouble which has been recognized and the remedy applied without any evidence of a conscious thought by the anesthetist. This subconscious act may have been brought about by the thorough preparation of the anesthetist, coupled with his experience.

One of the best ways of handling emergencies is to be able to recognize their approach and apply preventatives. While it may be that all of us may not attain to the point of perfect efficiency, it is our privilege, and also our duty, to take every precaution to make all possible preparations to properly care for those who have shown confidence enough in our ability to place their life in our hands. The question is, How?

In the first place, the best moral, physical and mental training obtainable would make a splendid foundation.

A moral man is trusted. One with a pleasing personality inspires confidence, and the mental training is the special weapon with which to fight and win. By mental training I mean the knowledge of conditions that exist from which an emergency may arise; the recognition and application of the treatment for these emergencies, and contraindications.

A thorough understanding of human nature is a valuable asset to those who possess it even in a small degree.

The emergencies that may and do arise are from three causes:

First: Mental and physical condition of patients.

Second: The anesthetic.

Third: The nature of operations.

First, the proper preliminary preparations, as to diet, time of operation and assurance, is invaluable. The control of the *second* is naturally a thorough understanding of the agent used, its physiological action and its proper administration. The *third* is proper technic; control of hemorrhage, saliva, props and particles of teeth and debris.

I hardly think it necessary to call attention to, only in a brief way, of the agents necessary in handling emergencies that may arise, and I only refer to them in passing: Tongue forceps, mouth gag, hypodermic, cotton tampons, nitrate of amyl, whiskey, brandy or light wine, aromatic spirits of ammonia, strychnine sulphate 1-20 to 1-60, and, needless to say, a knowledge of methods of artificial respiration.

Syncope and cessation of respiration, dropping back of tongue, accumulation of saliva, blood or vomit, has been the only conditions, fortunately, that I have been called upon to handle. And these cases responded very readily to the simple remedies such as lowering the head, applications of cold cloths and administration of stimulants, cleansing out the mouth and throat and resorting to artificial respiration.

I have had most of my trouble from mucous in the throat, and, in the preliminary examinations, should I find the mouth containing that characteristic frothy, stringy saliva, I require the patient to cleanse out the mouth with cold water and then take two or three swallows. I think this treatment has been beneficial.

I have seen a few such cases during analgesia produced by the dust from the teeth excavated, a preventative measure in operations of this character being to pack lightly the posterior of the mouth with moist gauze.

In all cases of excessive accumulation of saliva, blood or moisture in the mouth, discontinue the anesthetic, let the patient come out. Cleanse out the mouth and throat well before attempting further procedures.

I believe it would be well, even in major surgery, to use a mouth prop. This would enable the anesthetist to cleanse out the mouth or throat instantly without having to take the time to introduce a gag, which, in some cases, would be difficult on account of the contraction of the muscles. It would also enable him to grasp the tongue easily if found necessary.

A capable assistant I have found to be of great value. I have had for some time a graduate nurse who has been of great service to me, not only in calling my attention to unfavorable symptoms and assisting in emergencies, but by handling the patient in such a way as to relieve his mind of fear and anxiety.

SOME SUGGESTIONS ON AMALGAM TECHNIC*

BY R. N. HARWOOD, D.D.S., MORRISTOWN, TENN.

THE SUBJECT of this paper has been dealt with by eminent men, both in the profession and in the manufacture of various devices, and should have brought us face to face with perfection itself, but frequently we stumble on some work, always done by some other fellow (we are ashamed to own it ourselves), that would make failure turn green with envy. I am going to show you one of those pieces of "amalgam restoration," if you please, that was indeed done by the other fellow, the patient could not remember who did the work, so I very quietly took a wax impression of the tooth and cavity that you are now inspecting. There are many phases or lessons to be gotten from this in order to make away with such practice, and I shall not dwell on this point, hoping that someone else more capable will devote some time to that. I feel that to advise the use of matrix to you, gentlemen, is time wasted, for no doubt every one under the sound of my voice knows too well the use of matrices and advantages in their use.

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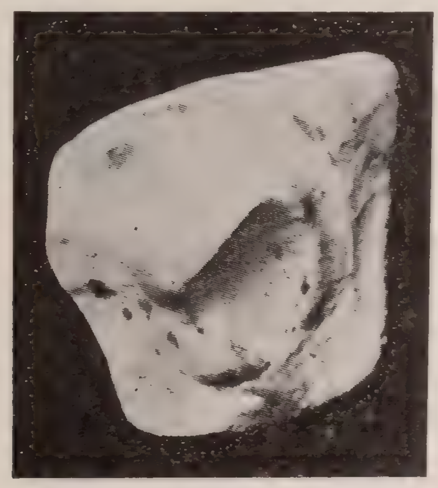
*Read before the Tennessee State Dental Society, 1916.

This is only one of many cases very similar that have come under my observation, and that prompt this paper. I have seen equally as badly inserted amalgam fillings in the labial surfaces of the six anterior teeth of the upper jaw. To be sure I denounce the practice of even the attempting of filling the anterior six and frequently the eight teeth with amalgam. The supposition is that the cavity has been properly prepared and ready for the filling, and then under all circumstances the use of the matrix should be resorted to in cavities of this nature.

I personally use the Ivory matrices in cases of this kind, but there are any number on the market that are adapted to different ideas, but always use some kind of matrix if it be your own make; and then, lastly, the amalgam filling should be as nicely polished and burnished as if it were a gold or a synthetic filling. Dr. Noel, while lecturing in the U. of T., told us that there would always be a recurrence of decay if this were not done.



Enlarged to twice its size.

I understand that there is to be a paper on the subject of Preparedness, not for war, but I am not so sure but one lesson to be gotten from this subject is preparedness to practice dentistry in a more conscientious manner and at a fee that will justify a proper rendition of the service. Now the question of the fee is a matter of individual concern and does not enter into this paper, but I have had patients tell me that they could get amalgam fillings inserted for 25 cents, and 50 cents for big ones.

I have told you in these few remarks only that which you all know and have heard since the day you began to study dentistry, but I hope that some of us will be more careful in the future about "our" overhanging edges.

There is still another phase of proper restoration with amalgam, and that is contact point and the occlusal surface. Too much stress cannot be placed on this point of proper occlusal contact to insure sufficient masticating surface, as well as proximal contact to prevent the packing of food particles between the teeth to cause trouble sooner or later.

Also, there is another point that to my mind is a very important one, and that is the thorough mixing of the amalgam.

MISCELLANEOUS CASTING*

BY W. A. SANDERSON, D.D.S., PITTSBURGH, PA.

AT THIS CLINIC it was my pleasure to demonstrate under the title, Miscellaneous Casting. I was the first man in Pittsburgh to demonstrate a cast gold base to a porcelain crown top, having purchased one of the first Jamison casting machines sold in our city. My name appears on page 14, "Practical Manual of Dental Casting," as among the early experimenters. Am still experimenting as follows:

First: Casting backing for Steele's anterior facing. Select facing, grind to place, oil slightly, roll soft wax to point, force into groove, and with finger pressure mold to facing. Trim surplus wax, remove by downward pressure, invest and cast in usual manner For bridge abutments, no solder is required except to unite parts.

Second: Same procedure as above for bicuspids and molars. Carve cusps, backing and pin and cast in one piece.

Third: Casting boxed backing for Steele's saddle backs. Grind to position, slightly bevel edges to facilitate removal of wax; always oil and you will experience no trouble in removing wax. The result: a boxed-in saddle-back—no possible chance of porcelain fracture, providing articulation is as it should be.

Fourth: A ticklish problem in many cases, for instance, a porcelain crown has been attached to a lateral root. I say "lateral" because that particular tooth has a very small, frail root, and we hesitate to remove pin. I proceed as follows: Leaving pin in root, with safe-sided burs I prepare root-end as I want it, select crown top; grind to place, wax crown top end, force to position, carve surplus wax, remove and insert carbon point from ordinary lead pencil; put into pin hole in wax; cast direct to porcelain, having case as hot as possible to prevent porcelain fracture; with bur, grind out carbon, polish and cement to place.

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*Clinic, Odontological Society of Western Pennsylvania, Pittsburgh, October, 1916.

Cutting Cavities in Artificial Teeth

To prepare cavities in porcelain teeth take a small worn-out engine bur, grind off to a sharp point, drive through a piece of German silver plate, 31 gauge, about one-quarter inch square. While it holds tight solder to shank of bur with either gold or German silver solder, trim the corners off hexagon shape, leaving about one-sixteenth inch from shank to edge of disk. Now take an old engine stone and powder with a hammer and keep in small box. One stone will last a lifetime. Prepare outline of cavity margins with engine stone, then put in disk mandrel and dip in oil or water and then in the powder. The disk, if not pressed too hard against the porcelain, will drag the cast powder under it and cut as good a cavity as a diamond drill and just as quickly, and costs you nothing. Make five or six while making them. Press the tooth or crown to be prepared in a small piece of modeling compound, warmed, and have portion of tooth to be worked on elevated above the compound. Fill tooth without removing and finish.

—*W. C. Shallanberger, The Dental Review.*

ORAL SURGERY
CASE REPORTS

CONDUCTED BY HUGH W. MacMILLAN, D. D. S., CINCINNATI, OHIO
THIS DEPARTMENT AIMS TO REPORT INTERESTING ORAL SURGERY CASES IN BRIEF FORM, ILLUSTRATED BY RADIOGRAPHS AND PHOTOGRAPHS WHERE POSSIBLE. ARTICLES FOR THIS DEPARTMENT MUST NOT BE MORE THAN 500 WORDS IN LENGTH. SEND CONTRIBUTIONS TO DR. HUGH W. MACMILLAN, UNION CENTRAL BUILDING, CINCINNATI, OHIO.

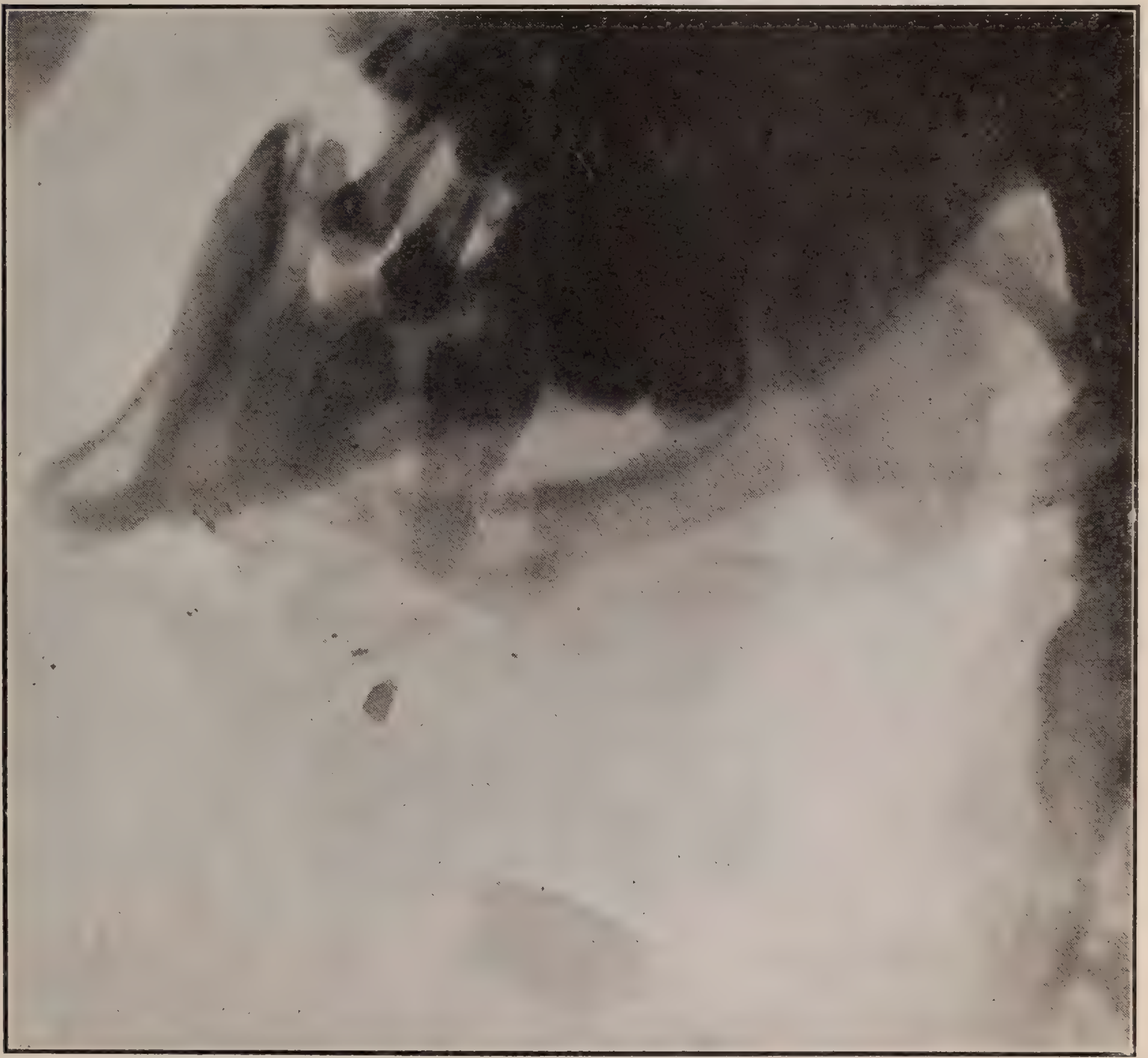

Fig. 1 Case I

Case 1—Gun-shot wound; left cheek and neck; open comminuted fracture left lower jaw. L. K., age 30, was admitted in alcoholic condition, bleeding slightly from circular wound in left cheek. Probe could be passed through the wound into the neck below the jaw. The wound also communicated with the mouth. Stereoscopic X-ray plates show a comminuted fracture of the lower left jaw with the presence of a bullet in the tissues of the neck. Fracture was reduced and lower teeth wired to upper teeth.

Four weeks afterwards, patient developed swelling and temperature. Opening in neck was enlarged and bullet removed. After six weeks' treatment patient was dismissed improved, with instructions to return daily for further treatments.

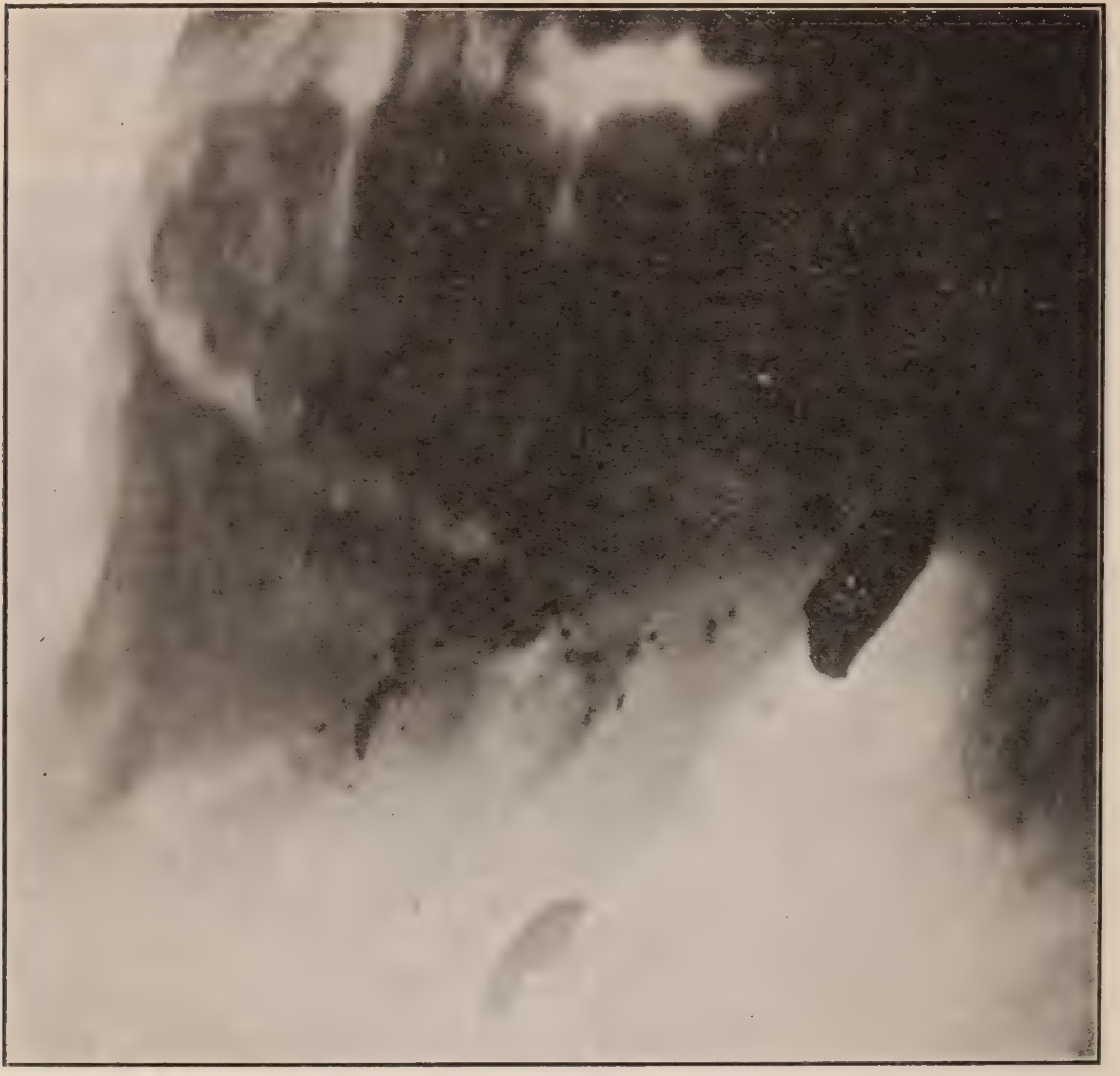

Fig. 2. Case II

Case 2—Gun-shot wound of cheek; fracture of lower jaw. T. K., age 35, Bulgarian laborer, was admitted bleeding from gun-shot wound in left side of cheek, also with wound on the top of the head. Probing the wound in the cheek revealed pieces of shattered bone. X-ray examination shows a bullet wound in angle of lower jaw with two fragments of the bullet behind ascending ramus of the jaw. Incision was made and portion of bullet removed. Lower teeth were wired to the upper. Mouth sprayed and wounds dressed daily. Patient was a police case and was making satisfactory recovery when he escaped from hospital.

Cases reported by Dr. Hugh W. MacMillan.

CORRESPONDENCE

POISONING BY B-EUCAIN

EDITOR THE DENTAL SUMMARY:

In the current issue of your journal appears, on page 165, an article entitled, "Fatal Case of Poisoning by B-eucain," by Judah Leon Jona, Malvern, Victoria, giving case history, autopsy, findings, etc.

The minute amount of B-eucain lactate used, the fact that collapse ensued immediately and that all means employed were of no avail, together with a careful study of symptoms, leads us to take issue with the author in his diagnosis as to the actual direct cause of this death, and to advance the idea that in all probability his eucain has been condemned unjustly. Possibly the local as represented in his formulæ combination may obtain many advantages and be extensively used in his section of the globe; the use of horse serum singly or in combination in oral surgery by American dentists, in so far as we are informed, is neither advised, considered practical, nor safe, owing not only to difficulty of readily obtaining the fresh product, but to the fact of rapid deterioration and impossibility of knowing absolutely just when the turning point from purity to toxity occurs. It appears to us this death was no doubt due to anaphylaxis, or serum poison. If a searching investigation of this boy's previous life does not reveal a prior attack of diphtheria or some other disease wherein horse serum in anti-toxin or other therapeutic measures was administered, thereby bringing about in his system a condition of anaphylaxis, then it is our opinion that this particular specimen of serum must have been intensely toxic and in reality the direct and sole agent, producing a condition positive curative measures of which are unknown.

Further discussion with exchange of ideas on above invited.

S. G. BRADFIELD, D.D.S.,
R. L. KURTZ, M.D.,

Nowata, Okla.

To Prevent 95% of Phenol From Crystallizing

Instead of warming the phenol add a few drops of denatured alcohol and you will find that it will remain solvent no matter what the temperature of the room may register.—*William V. Sher, Chicago, Dental Review.*

EDITORIAL

A PLEA FOR A MORE COMPLETE ORGANIZATION OF THE DENTAL PROFESSION

When we take into account the fact that the National Dental Association has a total membership of nearly one-half of the dentists practicing in the United States, it may at first thought seem absurd to propose *a more complete organization of the dental profession.* And yet we feel that this is possible and that it should be done.

To show what organization will do, we will cite what it has already done for the National and a few state dental societies.

At the time of the reorganization of the National Dental Association it had approximately only about seven hundred members, while it now has about twenty thousand.

When the National was reorganized there were but a few states that were organized into district or component societies. Now eighteen states are so organized, and let us see what this organization means to the state society. Illinois was the first state to completely organize component societies, although at that time a few other states had a limited number of district societies.

At the time of this organization in 1904, the Illinois State Dental Society had a membership of two hundred and seventy-four paid members. Now the Illinois State Society has about eighteen hundred paid members.

Ohio, at the time of organization of component societies, had about two hundred and fifty members in good standing in its state society. Today it has approximately thirteen or fourteen hundred paid members.

Michigan, Iowa and other state societies have increased their membership in about the same ratio since organization of component societies

Every state society in the Union (except Nevada, which as yet has no state society) is now affiliated with the National Dental Association. If the total membership in the National at present is twenty thousand, with only eighteen states organized into component societies, what would it be if the remaining states would organize? And not only this, but a complete organization of any state society means much to the profession of that state, especially when legislative and other important measures are sought.

For instance, the Ohio State Dental Society has a legislative committee, as do other state societies, and its component societies have each a legislative committee comprising a member from each county, where several counties are included in a component, or a committee of three where the component comprises only one county. Now, in case of pending legislation that needs combined and immediate action on the part of the dental profession of the state, the state society committee notifies the various component societies' legislative committees, and within two or three days letters of approval or disapproval, as the case may be, come pouring in upon the members of the legislature by the hundreds, voicing the desire of every member of the state society.

And here is where numbers count. A state society with only a hundred and fifty or two hundred members has, as a rule, but little influence on the legislators, but an organization comprising from one to two thousand members can make the legislators "sit up and take notice." Other state and component societies may already be organized in this way, but if they are not, they should be. When it comes to national legislation of interest to dentists, think what it would mean to have the individual support and influence of all the members of the National Dental Association throughout the states.

And this can be accomplished *if every state dental society will organize components and appoint a standing legislative or emergency committee in both state society and its components.*

Then the national society committee would notify the state societies' committees, and the state societies would notify the component society committees, and there would be an immediate and united response. And think of the influence this would have on Congress, whether the appeal be sent to Congressmen direct or through the state chairman or other source.

We have demonstrated what an influence such an organization has had in Ohio in the past few years and realize what a power it would be to the profession generally if all states would organize in this way. Probably most of the states not yet organized into component societies will meet between this and the time the National has its next meeting, and we hope that they will look at the matter seriously *and organize at once.* It's a duty every state owes itself as well as the National Association. Every year matters of vital importance are coming up for action in Congress or some state legislature, and it is only through a complete organization and united effort that we can hope to obtain the full legislation and recognition the dental profession feels entitled to.

NEW PUBLICATIONS

Anatomy and Histology of the Mouth and Teeth. By I. Norman Broomell, D.D.S., Professor of Dental Anatomy and Clinical Dentistry, Philadelphia Dental College, formerly Dean and Professor of Prosthetic Dentistry, Dental Anatomy and Histology, Dental Dept. Medico-Chirurgical College, Philadelphia., and Philipp Fischelis, M.D., Associate Professor of Histology and Demonstrator of Embryology, Medico-Chirurgical College, Philadelphia. Fifth edition, revised; Philadelphia. P. Blakiston's Son & Co., Pub., 1917. Price, net, $3.00.

There probably are few dentists who are not familiar with this popular textbook that is now in its fifth edition. In the preparation of the work, the aim of the author was to systematically describe those parts of human anatomy which come directly under the care of the dentist. As new editions have been issued the book has grown in size and value. For the fourth edition a thorough revision was made and much new material added, such as a description pertaining to general Cytology, general Embryology, and Histogenesis and further presentation of the significance of the facts gained for an intelligent understanding of the formation of the organs of the mouth.

This was further amplified by the addition of a comprehensive description of the present status of our knowledge of blood and lymph, a study of the structure of the circulatory apparatus, and a general consideration of the structure of various forms of glands.

In this fifth edition the authors have carefully revised and corrected certain phraseology in Part I, and also by rearrangement of the chapters on: General Description of the Teeth, The Permanent Teeth, Classification, Surfaces, Etc., The Roots of Teeth, The Dental Arch and Occlusion and Articulation of Teeth, have brought this subject matter into more convenient form. It was found unnecessary to make much revision to the second part of the work, comprising Histology and Histogenesis.

The book is splendidly illustrated with 368 engravings. It contains 457 pages of text and an excellent index.

Human Physiology Especially Adapted for Dental Students. By R. G. Pearce, B.A., M.D., Assistant Professor of Physiology, Univ. of Illinois, and J. J. R. Macleod, M.B., D.Ph., Prof. of Physiology, Western Reserve Univ. Second revised edition. St. Louis; C. V. Mosby Company, Pub., 1916. Price, net, $3.00.

A knowledge of the fundamentals of human physiology is essential in the training of the dental student because physiology constitutes, along with anatomy, the basic science upon which all medical and surgical knowledge is founded, and dentistry is a highly specialized department of surgical practice.

A knowledge of the laws of nutrition and dietetics should form a most important part of every course in dentistry, and these have received particular attention in this book.

The physiology of the digestive system, of the circulation of the blood and of the nervous system has been given careful consideration.

Besides knowing something about the physiology of the body as a whole, the dentist should be particularly familiar with the local physiology of the mouth, such as finely co-ordinated nervous mechanisms involved in the acts of mastication and swallowing, and the secretion of saliva. He must understand the nature of the sensations of the teeth and buccal mucosa, and be on the lookout for any lesions of the cranial nerves that supply the muscles and other tissues adjacent to the mouth cavity. These things have been carefully dealt with.

The chemistry of the saliva has demanded special attention because of the very interesting scientific investigations which are being prosecuted regarding the nature of the undoubted relationship that exists between changes of saliva and the incidence of dental caries.

Some space has also been given to a review of the main physico-chemical principles which may regulate the reaction and neutralizing power of the saliva.

Very instructive laboratory demonstrations are described in an appendix at the close of the book, and the outlines of experiments found here are arranged to occupy about sixty hours of laboratory work. To facilitate a clear understanding of the subject, diagrams have been used whenever necessary, and many of these were drawn especially for this work. In the book are fifty-nine illustrations, including ten color plates.

Fundamentals of Pathology for Students and General Practitioners of Medicine and Dentistry, and for Nurses in Training Schools. By Paul G. Woolley, B.S., M.D., Professor of Pathology, Univ. of Cincinnati; Director of the Pathologic Institute of the Cincinnati General Hospital, Cincinnati, Ohio. St. Louis; C. V. Mosby Co., Pub., 1916. Price, net, $2.50.

In his preface the author says: This volume makes no pretense of being either complete or perfect. All that it pretends to do is to make it possible for certain groups of students of one or another aspect of medicine to get a bird's-eye view of the problems of pathology and of the methods of disease. There is a rapidly growing need among the students of dentistry for something more than the often superficial and somewhat disconnected accounts of the basic principles of their art. More and more the dentist is realizing that his problems and those of the physician are very close together; so close that it seems that dentistry will no longer be looked upon as essentially separate from medicine and surgery. There is, then, every reason why the dentist should be provided with a systematic treatise which, while it is not applied specifically to his work, will form a basis for closer relationship with his fellow students in medicine.

Part I. is devoted to General Pathology, and Part II. to Systemic Pathology.

The book comprises 180 pages of text, illustrated with 179 engravings.

Dental and Oral Radiography—A Text Book for Students and Practitioners of Dentistry. By James David McCoy, D.D.S., Professor of Orthodontia and Radiography, College of Dentistry, Univ. of Southern California, Los. Angeles, Cal. St. Louis; C. V. Mosby Co., Pub., 1916

This book has been written as a textbook for students and also a book of instruction for practitioners who need the fundamentals of X-ray technic. It is a book every dentist can study with profit. No dentist should attempt X-ray work until he obtains some instruction, for so many things have to be taken into consideration to get the best results. And besides, he should understand the dangers of the X-ray and its use, and the methods of protection.

The text comprises nine chapters and is discussed under the following heads: The Nature of the X-ray and its Discovery. High-Tension Electric Currents—Magnetism—Electro-Magnetic Induction; X-ray Machines; Rhumkorff or Induction Coil—Tesla or High Frequency Coil—Interrupterless Transformer; Requisites of the Dental X-ray Laboratory; Technic of Dental and Oral Radiography; Development of Plates and Films; The Interpretation of Dental and Oral Radiographs; Dangers of the X-ray and Methods of Protection.

Seventy-one illustrations are used throughout the text. The book contains 153 pages of reading matter, well presented, and is printed on excellent paper.

Dental Anatomy. By Martin Dewey, D.D.S., M.D., Professor of Dental Anatomy and Orthodontia, Kansas City Dental College; President of the Dewey School of Orthodontia, Kansas City, Mo. St. Louis; C. V. Mosby Co., Pub., 1916. Price, net, $2.75.

The study of dental anatomy is of great importance to the dentist, and the student should be thoroughly drilled in the subject, and it is for this purpose that this book has been prepared.

Besides giving a description of the teeth as minutely as possible, the author has gone to considerable length in describing the anatomy of the pulp canal and also the anatomy of the tooth with reference to practical uses. The occlusal surface of the tooth as regards the ridges and grooves has been carefully outlined and much space has been devoted to the inclined planes.

The subject of root canals and pulp chambers has been carefully treated in order that the shape of the pulp canal in various conditions may be presented in such a way as to give the student some idea of what he may expect to encounter in certain teeth.

The author says: "The drawings of the deciduous teeth may be said to be composite. They have been made from various illustrations in the author's possession and from observations made upon models obtained in the practice of orthodontia.

The book contains 286 pages of text, is well printed and bound and illustrated with 133 engravings.

SUGGESTIONS

CONDUCTED BY F. R. CHAPMAN, M.S., D.D.S., COMUMBUS, OHIO

(To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Bldg., Columbus, Ohio.)

To Prevent Cracking of Porcelain Teeth in Soldering

Use two backings. Paint whiting on the lingual surface of the facing. Burnish 32-gauge pure gold over the lingual surface of the facing as backing. Then burnish a second backing over the first one about 28 gauge, drilling a hole through the second backing to permit the solder to flow through and connect the two backings. Split the platinum pins.

—*A. Berthold, Chicago, Dental Review.*

"Dead Teeth" (?)

Possibly we have been responsible for the term "dead teeth" being used so frequently that the medical fraternity have come to consider pulpless teeth as dead teeth, and as such they are considered foreign bodies which nature will try to throw off. Such an assumption is, of course, due to an ignorance of dental anatomy.—*Elmer S. Best, Dental Cosmos.*

Soldering Accident Repairs

Sometimes during the process of soldering a Richmond or bridge, a portion of the backing will burn, exposing the porcelain. The repair of the damage without even removing the work from the fire or allowing it to cool down, can be accomplished by patting cylinders of foil over the area until the desired contour or repair has been made. Then allow the solder to flow over and through this foil, care being observed in the use of the blow-pipe.

—*F. W. Frahm, Pacific Dental Gazette.*

Attachment for Anterior Bridge

It is my practice now when a patient wants an anterior bridge, say from one to four teeth, and the piers are in good shape and vital, to disk the sides of the teeth somewhat with sand-paper disks, to remove the contour slightly, but not going through the enamel. I then roll pure gold to about half the thickness of 30-gauge and fit a band a full one-eighth inch wide around the tooth as far up as I can go, being sure that it fits. Then I fit another band of the same material over the first band and solder the two together solidly and build my bridge upon these bands.—*F. A. Graham, Dental Cosmos.*

A Method of Making Bridge Abutments on Vital Teeth

May I add a mite regarding the question of septic bridge work? I believe that there is such a thing as having a dental bridge too permanent, and that it is a good thing occasionally to have a bridge come loose so that it can be cleaned, the abutments all made "sweet" again, the old cement removed, and the bridge generally put in good shape—the same as one would overhaul any piece of machinery.

It is my practice now, when a patient wants an anterior bridge, say from one to four teeth, and the piers are in good shape and vital, to disk the sides of the teeth somewhat with sandpaper disks, to remove the contour slightly, but not going through the enamel. I then roll pure gold to about half the thickness of 30-gauge and fit a band a full one-eighth inch wide around the tooth as far up as I can go, being sure that it fits. Then I fit another band of the same material over the first band and solder the two together solidly and build my bridge upon these bands.

A rigid band is essential, as it is hopeless to expect to fasten a springy band with cement. I have had much satisfaction from such work. Formerly I would have devitalized the teeth and made Richmond abutments or drilled holes in the teeth to cement pins into through a backing. I do this now in many cases where cosmetic reasons are paramount, but generally, where the appearance of a band is not contra-indicated for cosmetic reasons, I use the band and leave the teeth vital. I wish someone would invent an enamel that could be fused on gold as is bathtub enamel on iron—so that we could enamel the bands in banded bridges.

I think more of vital teeth than I did, and I put off the day of devitalization as long as possible.—*F. A. Graham, D.D.S., Cosmos.*

Dr. Conzett's Inlay Investment

There are many good investment materials on the market, and my only reason for giving the formula of that which I use is the fact that it can be made a good deal more cheaply than bought, and to most of us that is an object. We take one part of plaster of Paris, three parts of finely pulverized silex and one-half part of Dixon's flake graphite. This is thoroughly mixed together by sifting it through an ordinary flour sifter three or four times. I always aim to use the same quantities of the investment material and water, and in order to do so always measure them.

—*J. V. Conzett, Journal Allied Dental Societies.*

Depth of an Inlay Cavity

I have been asked how deep a cavity should be, and I cannot say; but this I will say, that it must always be cut through the enamel and never less than 1½ millimeters in depth.—*J. V. Conzett, Jour. Allied Dent. Soc.*

Carborundum Discs

In using carborundum knife-edge discs to trim down a tooth preparatory to crowning, they may be rendered "safe" for the adjacent tooth if a sandpaper disc of same size be attached on the screw mandrel with the stone, the varnished side being outermost.

—*Reginald S. Boys, Commonwealth Dental Review.*

Asepsis in Root Canal Operations

The hands should be carefully cleaned just as the operation is to be begun, but nothing should be put into the canal of the tooth which has been touched by the fingers. The field of operation should be isolated, washed with alcohol and painted with iodin, to insure against carrying any foreign material into the pulp chamber and introducing infection there.

—*Edgar D. Coolidge, Dental Review*

Pyorrhea and Goitre

Goitre is due to a large extent to some septic focus. Nearly all these cases of pyorrhea, if they have not a goitre, they have the symptoms and signs of it, such as nervousness, palpitation, and general debility and weakness. There is no part of the body which cannot be attacked once you have septic conditions.—*Dr. Sidney Pern, Australian.*

Devitalizing Deciduous Teeth

As early as possible in the treatments of exposed pulps in the deciduous molars I apply a little devitalizing paste and secure it in the tooth with cement or amalgam. I then tell the parent of the child that I will not treat that tooth again so long as it remains comfortable. If it causes any discomfort, bring your child to me for another treatment. In ninety-five per cent. or more of such cases there is no occasion for any further treatment, which makes it easy on the child and enables the dentist to escape much of the most trying ordeals of his professional life.—*H. A. Cross, Dental Review.*

Pulpless Teeth

We can no longer go on in the profession managing pulpless teeth in the manner they have been in the past. We must improve our technic, else we lay ourselves open to serious criticism; yet I want to make the statement tonight, if all the things were true that have been said as to the evils done by pulpless teeth, very many of our patients who are living and well today would have been dead long ago.—*C. N. Johnson, Dental Review.*

SOCIETY·ANNOUNCEMENTS

Lake Erie Association

The fifty-fourth annual meeting of the Lake Erie Dental Association will be held at the Hotel Barlett, Cambridge Springs, Pa., on May 24th, 25th and 26th, 1917. D. S. Sterrett, *Secy.*

Georgia State

The forty-eighth annual meeting of the Georgia State Dental Society will be held at Brunswick, Ga., June 14, 15 and 16, beginning Thursday, June 14th. We extend a most cordial invitation to members of other associations to meet with us. For application blanks and full particulars, address, M. M. Forbes, *Secy.*

803-04 Candler Bldg., Atlanta, Ga.

Indiana State

The fifty-ninth annual meeting of the Indiana State Dental Association will be held at the Claypool Hotel in Indianapolis, on May 15-16-17. A very good program of papers and clinics has been prepared and a sincere invitation is extended to members of other state dental associations to attend.

A. R. Ross, *Secy.*

North Carolina State Board

The next meeting of the North Carolina State Board of Dental Examiners will be held at Durham, N. C., beginning promptly at 9:00 o'clock on Monday morning, June 25, 1917. For further information and application blanks address the secretary, F. L. Hunt, Secy., Asheville, N. C.

South Carolina State Board

The next annual meeting of the South Carolina State Board of Dental Examiners will be held at the Jefferson Hotel, Columbia, S. C., beginning promptly at 9 o'clock Tuesday morning, June 26th, 1917. All applications must be in the hands of the secretary by June 16th.

Application blanks and full information may be obtained by addressing,

R. L. Spencer, *Secy.*
Bennettsville, S. C.

Ohio — Toledo

The Annual Clinic of the Toledo Dental Society will be held Friday, April 20th. All ethical dentists are invited to attend and take part.

807 West Central Avenue T. D. Barnett, *Secy.*

Four States Post Graduate Dental Meeting

Alabama - Mississippi - Texas - Louisiana

The meeting will be held in New Orleans, La., June 4-7, 1917. From the reports that are coming in from the various committees of the Four States' meeting as regards the great interest being manifested in the forthcoming Alabama, Mississippi, Texas and Louisiana Post-Graduate Dental Meeting, it will be the greatest meeting in the history of the dental profession. This interest is exceeding the expectations of various committees, which goes to show that the average dentist is alive to the necessity of keeping abreast in the forward movement of his profession, and that he is ready and willing to grasp the opportunities offered him to advance.

Dr. S. H. McAfee, chairman of the Scientific Program Committee, submits the following report of progress to date. While many of the details have been finally arranged, a number of essayists and clinicians positively engaged, and some matters still in debate, the following is a synopsis of the work of our committee to date:

PROGRAM

"Nerve Blocking," Dr. Arthur E. Smith, Chicago College of Medicine and Surgery.

"Removable Bridge Work with Most Advanced Lock and Saddle Construction," instructor not yet positively chosen. In communication with Dr. Carl G. Knocke, of Chicago; Chayes Dental Club of New York, and others.

"Removable Bridge Work Without Mutilation of Sound Teeth," Dr. Norman Beverly Nesbett, of Harvard Univ. Dental School, Boston, Mass.

"Apiectomy, Periodontia, Prophylaxis, Stomatology, Exodontia, Etc.," Carl D. Lucas, Indiana Dental College, Indianapolis, Ind.

"Treatment of Fractures of Maxillæ and Mandible," Dr. J. P. Wahl, Loyola University School of Dentistry and Charity Hospital, New Orleans.

"Root Canal Preparation and Filling, Ionic Medication, Radiography, Etc.," in communication with Dr. Alonzo Milton Nodine, of New York City.

Clinical Motion Pictures, (in moving-picture theatre). Clinical Film Company of New York and S. S. White Dental Mfg. Co. A partial list of films already prepared (with more in preparation): "The Extraction of Teeth Under Nitrous Oxid Anesthesia," by Dr. J. D. Thomas; "Periodontia Clinic, Prophylaxis for Pyorrhea," by Dr. Paul L. Stillman; "Angle's Original Method of Taking Impressions; Dr. Edward H. Angle's Application of Angle's Ribbon Arch Appliance for Correction of Malocclusion; "Root Canal Filling," by Dr. R. Ottolengui; "Apiectomy," by Dr. Joseph M. Levy; "Root Amputation," by Dr. A. Berger; "Making Porcelain Teeth;" Dr. Alexis Carrel Demonstrating His Latest Methods at the Hospital Rond Royal, at Compiegne; "Plastic Surgery of the Face and Jaw," by

Dr. Pont at Lyon, Re-education Center at Vizille; "Extraction of a Shrapnel Ball from the Region of the Heart," by Prof. O. Laurent, at Grand Palais; "Functional Conditions Contracted from Life in the Trenches;" "American Method of Bone Grafting as Performed in European War Hospitals," by Dr. F. H. Albee, of New York. Additional films are being prepared weekly. They run from fifteen to forty-five minutes each. It is stated that these films show the technic of the various operators in amazing detail.

"General Progressive Clinic," by the specially engaged instructors. All or a part of one day will be devoted to this feature, which is to be a part of the general four-days' meeting.

"Special Detailed Technical Courses," immediately following the four-days' general meeting. The object sought here is to afford opportunity for those who may wish to do so to obtain more personal instruction in the technic in any of the subjects in which they may be specially interested—such instruction as can only be given to small classes of ten or fifteen men each. These will be enrolled in the order of applications for membership, and when classes are filled, no additional men can be taken therein. A small additional fee will be charged those wishing to take advantage of this special feature.

Dr. Charles Shepard Tuller, chairman Committee on Exhibits, reports that the Dental Manufacturers' Club of the United States will exhibit at our meeting, which insures a good display. A list of all exhibitors will later appear. The exhibits will be one of the attractive features of the meeting, and be held on the same floor.

Dr. O. Loeffel, chairman of Committee on Arrangements, Railroad and Hotel Rates, reports that the headquarters of the meeting will be the Grunewald Hotel, which is a modern, up-to-date building and well ventilated. The entire top floor of the Hotel Grunewald, the same on which our meeting takes place, will be reserved for members, and those members desiring to take advantage of this offer must write at once for reservation. The various hotels are offering rates as low as $1.00 per day, and up. The railroads will give one and one-third rates for round trip.

J. P. Wahl, D.D.S.,
Maison-Blanche Bldg., New Orleans, La. *Ch. Pub. Com.*

Massachusetts State Dental Society

The fifty-third annual meeting of the Massachusetts State Dental Society will be held on May 3, 4 and 5, 1917, at Springfield, Mass.

J. Arthur Furbish, D.M.D., *Secy.*

Michigan State

The Michigan State Dental Society will hold its annual meeting at Detroit, April 12, 13, 14.

Kentucky State

The next annual meeting of the Kentucky State Dental Association will be held at Louisville the three days previous to the Kentucky Derby—May 9, 10, 11, 1917. Address all correspondence to Dr. W. M. Randall, Louisville, Ky. W. M. Randall, *Secy.*

Illinois State

The fifty-third annual meeting of the Illinois State Dental Society will be held in Quincy, Ill., May 8, 9, 10, 11, 1917.

Henry L. Whipple, *Pres.*, Quincy, Ill.
J. P. Luthringer, *Secy.*

South Dakota State

The thirty-fifth annual meeting of the South Dakota State Dental Society will be held at Sioux Falls, April 26th and 27th.

Ernest W. Elmen, *Secy.*, Sioux Falls, S. Dak.

Massachusetts Dental Society

The fifty-third annual meeting of the Massachusetts Dental Society will be held in Springfield, Mass., May 3rd, 4th and 5th, 1917. This meeting will have as its keynote, "Better Dental Service Through Efficiency."

Mr. Stewart Anderson, editor and advertising manager for the Massachusetts Mutual Life Insurance Co., will talk on "Dental Psychology, or Winning and Keeping the Confidence of Your Patient." Mr. Anderson will dwell also on the development of personality.

Mr. P. R. Kirchner, an expert accountant of fifteen years' experience in many kinds of business, and who has specialized for two years on systematization in dental practices and is thoroughly conversant with dental supply business as well, is to talk on "The Business Side of Your Professional Life."

Efficiency in office equipment and management is a subject that will be well covered.

A special feature of the meeting will be the effort made by the management to have all members come by automobile. Members throughout the state and members and guests from adjacent states are already planning to come by automobiles and to bring their wives and friends in the profession. The society will take a fifty-mile automobile ride through the beautiful country around Springfield, visiting Smith College, Amherst College, Amherst Agricultural College and Mt. Holyoke College. All members will be taken care of.

The meeting, then, will train the members for efficiency in their work and will afford the members an opportunity to combine outdoor recreation with professional study and acquaintance.

(*Signed*) Harold H. Cleaveland, D.D.S., *Pres.*, Springfield, Mass.
C. Edson Abbott, D.D.S., *Editor*, Franklin, Mass.

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXVII MAY, 1917 No. 5

OFFICIAL ORGAN

The Ohio State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

Editorial Office: 195 16th Avenue, Columbus, Ohio
L. P. Bethel, M.D., D.D.S., Editor-in-Chief

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REGULAR CONTRIBUTIONS

THE TRUE CAUSE OF PYORRHEA—A NEW THEORY*

BY E. P. BEADLES, D.D.S., NORFOLK, VA.

PYORRHEA is *not* a germ disease. Investigators have been misled in their search for the cause. The conditions surrounding this trouble are peculiar. The disease itself is not peculiar. The anatomy of the parts affected is unique. In the entire human body there is nothing like it to be found.

We have a bone in which nature has fixed a series of ivory posts, admirably adapted for a certain purpose. To accomplish this purpose nature has had to exercise all of her wits. The task was a difficult one. Each post must stand alone, it must have individuality, it must act in harmony with many others. This post must have a cushion to it, immobility would mean its destruction. Ivory must be the material; nothing else could stand the strain.

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*Read before the Virginia State Dental Society, October, 1916.

Ivory is a hard, smooth substance. How can such a thing be held firm and at the same time be movable? The books tell us that a "membrane" holds this post to its place, but a membrane is a weak thing. Recent investigations† prove that there is no such thing as a "peridental membrane." We need strength at this point and nothing less than a ligament will do. Hence, the "peridental membrane" is not a membrane at all, but a ligament, which wraps itself around the root of this ivory post or tooth, sending off fibrils which fasten themselves into the alveolar process. Keep in mind the thinness of the process at this point, as this will be important in the explanation, which comes later, of the *cause* of this disease.

The socket is a cup, the sides of which run away to the thinness of a sheet of paper.

PUS FORMATION

Wherever there is a collection of pus there is tenderness and pain; the surgeon must search it out. We come now to the cause which has misled the investigation. This is the only place in the animal body where the formation of pus has a *natural drainage.* Everywhere else this fluid must burrow its way out, unless assisted by the knife.

Owing to the peculiar anatomy of the parts, the pus, as soon as formed, drains out along the side of the post in its socket. For this reason none of the symptoms which accompany the formation of pus elsewhere are manifested here. Not recognizing this fact the investigators have looked upon pyorrhea as a peculiar disease, necessarily having a specific germ; but the search has been in vain and will continue so to be, for the very good reason that there is none.

A SIGNIFICANT FACT

If the holders of the germ theory are correct, can they explain the "pocket?" Why is it that the bone will be destroyed often in a straight line extending to the apex of the root? Surely the bacteria could feed upon the bone all around the tooth equally well.

Again, if the germ theory is correct, there should be pus in all stages of the disease; as a matter of fact we do not find it except in the last stage, and sometimes not then.

NECROBIOSIS

There can be no primary infection without pain, tenderness or soreness. We absolutely know that many cases of pyorrhea never manifest these symptoms, and that no case is tender or sore in its early stages. If the germ theory be true, soreness would be manifested from the very first. We are then driven to the conclusion that here we have a destruction of tissue without infection, which is Necrobiosis. Often tenderness and soreness appear later when there *is* infection, but this is secondary, and results in the formation of pus as in all other infections.

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†See "Medalia," *Dental Cosmos*, September, 1916.

THE TRUE CAUSE

Why then the necrobiosis? What causes the death of the parts resulting in a so-called pyorrhea? To answer this question we must go to the very fountain of life, the heart. The failure of the heart to get the life-giving fluid to these parts. This being cut off, death must ensue.

In nearly all persons twenty-five years old and over, we find pyorrhea. The reason for this is plain; the arteries are less vascular, and it is difficult for the heart to force the blood through these very small vessels which supply the thin bone holding the tooth. In young persons, while the arteries are soft, we find this trouble rarely, and in all cases in persons under twenty years, a weak heart action will be noticed.

In all the literature upon the subject of pyorrhea will be found the statement that it is caused by tartar, injury to the gums, over-hanging fillings or malocclusion. As a matter of fact, none of these things produces this trouble. I have seen mouths where the only places not affected were those where there was an accumulation of tartar. It has been noticed by all observers that long, strong teeth, with no deposits whatever, are often badly affected with this disease. Often these mouths have had the best of attention and still the teeth begin to loosen and drop out. In other mouths where all of the above "causes" are present, we find no pyorrhea. Can this be explained by the germ theory? Not at all, but it can be explained by the necrobiosis theory.

The longer the tooth, the longer the thin bone which is to be supplied with blood; hence the more difficult to supply with blood. In short teeth, deeply set in the alveolar process, the more easily can the heart and arteries supply the life-giving fluid.

MALOCCLUSION

Faulty occlusion is one of the main causes referred to by nearly all writers on the subject of pyorrhea. We do find this disease very frequently in teeth that have no antagonist. It is well known that the exercise of any organ increases its supply of blood, non-exercise decreases it; hence a tooth which does no work is more liable to necrobiosis, as the supply of blood is less.

Man in his savage state used his teeth in many ways long since gone out of fashion—and modern cooking leaves little for the teeth to do; hence there is no coaxing of the blood to these parts, and the tooth with no antagonist, as said above, stands less chance to escape pyorrhea than its fellow.

If malocclusion can be assigned as a "cause," why do we often find a mouth perfectly articulated with pyorrhea from third molar to third molar? This "cause," along with badly fitting crowns, tartar, etc., must be relegated to the background; they do not explain.

It is evident that a tooth having once become loose from the loss of its enveloping bone must be kept at rest until the bone has been replaced. To do this we must grind it away until the opposing tooth does not disturb it; but this is for the same reason that a splint is put upon a broken bone.

MIGRATION

Why do teeth affected with pyorrhea migrate? If the disease is found on one side only, the fibrils going out from the "peridental membrane," or more properly, ligaments, are destroyed on that side; the fibrils on the opposite side act as a rubber band would do, pulling the tooth in that direction; hence, the uncomfortable spaces to be seen.

SLOWNESS

The course of this disease is long. Certainly from five to ten years from its inception to the loosening of the teeth. This fact is hard to explain by the germ theory, while it is perfectly compatible with the necrobiosis theory.

It has been observed by specialists in the treatment of pyorrhea that scarification of the bone is always followed by improvement in the appearance of the gum. If the germ theory be correct, this procedure would be the worst possible treatment, as the newly opened-up tissue would be immediately invaded. On the other theory it is plain why there is a beneficial effect. The irritation causes new bone cells to be thrown out.

DEPOSITS

. Either theory will explain the deposits found upon the roots. It is disintegrated bone, this being mixed with certain acids forms really a new substance, often a kind of concrete, which sometimes defies the finest steel instruments. In necrobiosis the first surfaces to die are stripped, or drawn to the still live parts, the concrete is thus often formed into ridges or lumps, a part of the root remaining free. In some cases there are no deposits whatsoever. This is where secondary infection has set in early, the progress of the disease rapid, leaving no time for the lime deposits, or concrete, to form. It is well known that these are practically incurable. The blood supply has been so effectually cut off that there is no chance for the bone to re-form. In these cases there is noticed also a particularly weak heart action.

NOT CONTAGIOUS

There is no evidence whatsoever that this disease is contagious. Were the germ theory the correct one, ample evidence would be forthcoming. If necrobiosis is the cause, certainly pyorrhea cannot be a contagious disease.

TREATMENT

All treatment of this disease heretofore has been empirical. We knew that we got results, but could not tell why. If the germ theory is false, it is evident that antiseptics can do no good. It is well known that they have proven of little value. If the necrobiosis theory is true, we know why surgical work has been effectual.

If we remove the dead bone we affect a cure.

The next step is to bring about a better circulation of the blood. This is a difficult proposition, especially if there is weak cardiac action. The best we can do is to build up the general health and supplement by vigorous massage. A proper toothbrush is the best instrument for this purpose. Cotton rolls and rubber pads are ineffective; something more stimulating is needed. The brush will do the work if properly used. Periodic examinations should be made, and the edges of all bone scarified to encourage new cell formation.

Thus we have a simple explanation of a formidable disease, a theory which accounts for all of the various phenomena observed in this so-called "pyorrhea," really Alveolar Necrobiosis.

One significant fact I have not mentioned: Often the anterior teeth will be badly affected with pyorrhea on the lingual aspect, and not at all on the labial. The reason for this is evident. The massaging by the brush has kept up a good blood supply on one side and not on the other.

HELPFUL SUGGESTIONS FOR EVERY-DAY PRACTICE*

BY ARTHUR H. MERRITT, D.D.S., NEW YORK, N. Y.

THE CRITICISM often heard of many of the papers which are read before dental societies is that they are too technical, that however interesting they may be in theory, they are of little practical value to the busy dentist. There is no doubt often grounds for such criticism. For that reason I shall attempt to give you something out of my experience which I have found helpful in making the day's work easier, and which has at the same time often contributed to the success of my work, and the satisfaction of my patients.

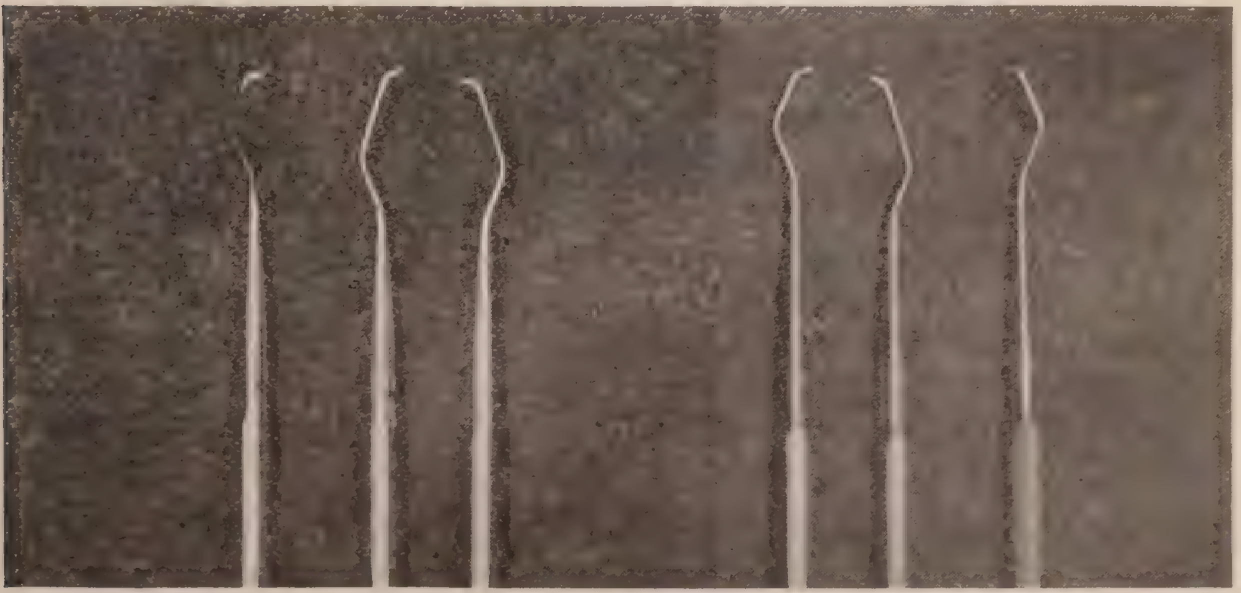

Fig. 1

I will first call attention to a set of six instruments which I have found exceedingly helpful in the operation of cleansing teeth. They are all modifications of a single instrument, one with a short angle for universal use, with two more of same angle made in rights and lefts; then another for universal use, with larger angle, and again rights and lefts of this instrument. They cut on both sides, may be used in a pull or push stroke, and when new, cut on the end as does a hoe instrument. They are designed for the removal of salivary tartar, and the serumal deposits which so often fill the subgingival space.

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*Read before the Ninth District Dental Society, State of New York, February, 1917.

A CAVITY VARNISH FOR TEETH SENSITIVE TO THERMAL SHOCK

There is a great variation in the sensitiveness of teeth to temperature changes. The range is so narrow in some cases as to make the use of cold water as a mouth wash decidedly unpleasant. This variation is frequently observed in the preparation of teeth for filling.

A cavity in a tooth may be comparatively superficial and yet so sensitive to thermal shock that the slightest blast from the chip blower will cause pain. The danger of metallic fillings in such teeth is well known. There also is the relatively deep carious cavity, where some protection to the pulp is obvious, yet where for some reason a cement lining is not desirable. A great boon in such cases is a cavity varnish which will protect the pulp against thermal shock, and at the same time make possible the use of any filling material that may be indicated. A preparation which I have found exceedingly valuable in such cases is one composed of gum dammar, commercial zinc oxid and Canada balsam. This may be prepared by any one in the following manner: Gum dammar, 1 dram; zinc oxid, 1 dram; Canada balsam, 5 drops. Fuse and pour into shallow molds. This is best done by first melting the gum dammar and stirring in the zinc oxid and Canada balsam. It is then transferred to a container and allowed to cool, when it is ready for use. In appearance it is hard, white and lustrous. A pellet of cotton saturated with chloroform is rubbed on the surface which exercises a solvent action on the preparation. When thoroughly saturated, it is transferred to the prepared tooth cavity, the surface of which is coated with the varnish. If a heavy coat is desired, a second application may be made, having evaporated the chloroform from the first application. The edges are then cleaned and the tooth is ready to proceed with the filling. The surface of a cavity so treated will have a white and glistening appearance. Used in this way, it is almost absolute as a non-conductor of heat and cold. A tooth so sensitive to temperature changes that the slightest blast from the chip blower will cause exquisite pain, will be wholly insensible to prolonged blasts once the cavity is thoroughly covered. Usually one application is all that is necessary. It is also exceedingly useful in protecting sensitive dentin against the irritating influence of the acid in cement fillings. In the oxyphosphate of copper, this irritating effect is often marked, causing no little pain at time of insertion. This will be wholly prevented by first applying the varnish. Not infrequently patients present complaining that certain teeth are sensitive to heat and cold. An examination reveals nothing more serious than a slight abrasion or erosion at the cervex which has not even penetrated through the enamel. On testing, such teeth prove to have slightly hyperemic pulps, and where several are involved, may produce a mild neuralgia of uncertain location. If not corrected this is a not uncommon sequela. Conditions such as this are usually temporary, often produced by the irritating effects of fruit acids, especially grapes. Excellent results may be obtained by washing off such teeth with warm alcohol, thoroughly drying and painting the involved surface with the varnish, usually making two or three applications. Evaporate the chloroform before allowing the moisture to come in contact with it. With a little care on the part of the patient in brushing these surfaces, an application such as this will often last two or three weeks, protecting the tooth against thermal shock and permitting the capillaries of the pulp to regain their normal tone. Often no other treatment is required. It not infrequently happens that this condition is complicated by exquisite sensitiveness to touch, such as might be produced by the tooth brush, finger nail or a steel instrument. This may be cured by isolating the tooth, preferably with the rubber dam, and applying forty per cent. formaldehyde. The technic I have found most satisfactory is to transfer a small quantity of the formaldehyde to a small receptacle into which is dipped an orange-wood stick prepared as for tooth polishing, which is then held over the flame of an alcohol lamp until hot, and then applying it to the irritated surface and vigorously rubbing it back and forth. This is repeated several times, often continuing the treatment for ten or fifteen minutes. When carefully done, the results are most satisfactory, and often permanent. Before removing the dam or napkin, dry and apply the varnish as directed above. This annoying and often complicated situation may be completely cleared up by the treatment here outlined to the great satisfaction of patient and dentist.

AN INEXPENSIVE AND QUICKLY-MADE TEMPORARY STOPPING

Many dentists are familiar with the fact that eugenol and commercial zinc oxid, when properly combined, make an excellent temporary stopping, but relatively few realize that even better results can be obtained by substituting oil of cloves for the eugenol, and fewer still realize what a wide range of usefulness it has in every-day dental practice. Nor do they realize how long it will last when properly mixed and legitimately used. It should be mixed with a stiff spatula on a ground-glass slab—never on a smooth glassy surface. The zinc oxid should be added slowly and spatulated until thoroughly incorporated. It is surprising how much can be added to the mass when saturation seems complete. Success depends upon incorporating *all* the liquid will take up. Its range of usefulness is very wide. Its sedative effect makes it most useful as a temporary stopping in aching teeth with vital pulps, especially in those cases in which there is not an actual exposure, and where time does not permit of doing more than is necessary to afford relief until appointment for treatment can be made. The fact that the cavity does not need to be dry adds to its usefulness. It may also be relied upon to seal medicaments in a tooth, providing it is not subjected to direct pressure from occluding teeth. When applied to cavities on approximal surfaces or on the buccal surfaces of molars, it will last for months, completely protecting the tooth. It should not, of course, be used on the occlusal surfaces of teeth. It requires several hours for it to set but it never becomes so hard that it cannot be easily removed with a hand instrument. Its sedative affect on sensitive dentin is marked, it is cleanly and not unpleasant to the taste and may be depended upon to last for weeks or months when properly employed.

OCCLUSAL TRAUMA

In the treatment of pyorrhea there are three things which are fundamental: Good root surgery, the establishment of a high order of mouth hygiene, which must be maintained by the patient, and the correction of occlusal trauma. The latter, which is absolutely essential to success, is most frequently overlooked. A general and exceedingly vague notion prevails that here and there will be found cases in which it is necessary to grind the occlusal surface of some tooth to protect it against over-stress, but relatively few at present realize that practically every case of pyorrhea has as one of its etiological factors occlusal mal-adjustment, or what has technically come to be known as occlusal trauma. A condition such as this is quite as likely to occur in mouths with normal occlusion according to the Angle classification as in mouths in which the occlusion is not normal. This seems to be due to the fact that the occlusal planes of the teeth are not worn sufficiently in the act of mastication to admit of a certain amount of motion or play upon these inclined planes, with the result that the strain which should be dissipated by such motion is communicated to the roots themselves, actually injuring the bony support of the teeth. Just what the changes are that take place in the alveolar process is at present uncertain, but it would seem to be not unlike osteoclasis—a progressive resorption of the bone which, if not corrected, will result in the eventual loss of the teeth, no matter what treatment is given the case. While there are cases which cannot be corrected without the co-operation of the orthodontist, most of them can be corrected by judicious grinding. This does not mean the indiscriminate grinding which is sometimes practiced, but the careful adjustment of the occlusal planes and incisal edges of teeth, as is shown to be necessary by thin carbon paper. This is best done by small stones of assorted sizes and shapes as made by Miller. This should be continued until there is a free play of the teeth upon one another without undue stress upon any of them, as shown by the carbon paper, and the motion of the tooth as felt with the finger placed lightly upon it. This is not done to relieve a tooth from its normal amount of stress, but from the trauma produced by ill-directed force. This is so important to the success of any treatment that it should be given first consideration in every case. Eventual failure is inevitable in most cases in which it is not observed.

LOCAL ANESTHESIA IN THE TREATMENT OF PYORRHEA

Despite the fact that the gums are abundantly supplied with nerves, they are normally insensitive to pain. Nevertheless, they may, under provocation, become exquisitely sensitive. This happens not infrequently in cases of pyorrhea with deep pockets, making good root surgery well nigh impossible. Very satisfactory results may be obtained in such cases by the use of dentalone or phenandyne. Dentalone is made by Parke, Davis & Company, and is composed of chlorotone, oil of clove and gaulthera. It has a pleasant odor and not unpleasant taste. Phenandyne is made by Schieffelin & Company, and is a non-escharotic phenol preparation. It is not as pleasant in odor or taste as dentalone, but will often give results in cases where the former fails. In using either, transfer a few drops to a suitable receptacle, and where the pocket is deep enough to permit, carry a small pledget of cotton saturated with the solution into the pocket and allow it to remain for a few minutes. During operation on the tooth, dip instrument in the solution from time to time and carry it into the pocket. There are very few cases in which one or the other of these does not give very satisfactory results. I make use of them in every case of advanced pyorrhea which I treat. They are both highly antiseptic, which is always desirable in these cases.

TOOTH BRUSHES

There are few people who keep their mouths as clean as they should, or as clean as they think they do. There are several reasons for this, but one of them is usually a poor tooth brush. An efficient operation is impossible with inefficient tools; therefore, the first step in correcting this condition is to provide the patients with tooth brushes adapted to their needs. The brushes upon the market are legion, but most of them are unsatisfactory, ill shaped and of poor quality. In order to meet this condition in my practice, I have designed and had my druggist make a brush which has proven satisfactory to me and my patients. These brushes are of good quality, of small size, and when properly used will do all that can be expected of any brush in keeping the mouth clean. They are made abroad and are distributed by my druggist, who delivers them to my patients anywhere in Manhattan without extra expense. They retail at thirty-five cents each, and are made in three grades, S, M and H. Any profit there may be in their sale goes to him. These brushes I prescribe to all my patients, carefully instruct them in their use, often giving them a demonstration in my own

Fig. 2

mouth. The results have been most gratifying. This is not alone due to the fact that I have placed in their hands a small brush of good quality, but because they have been impressed with the importance of a clean mouth, and once they have learned what that means in comfort to themselves, very few of them lapse back into the old hit-or-miss habit. There is no patent or name upon them, and any one is free to adopt them who cares to do so.

ARTERY FORCEPS

An instrument which I have found exceedingly useful in routine practice is a pair of artery forceps, though I do not use them for the purpose for which they were designed. It is an instrument about six inches long, so fashioned that when the beaks are brought together they may be locked, and anything grasped by them cannot be pulled out. Occasionally a patient presents with a quill of the tooth brush or a piece of silk caught between the teeth in such a way that it cannot be grasped by the fingers, and so wedged that the cotton pliers cannot dislodge it. In such cases the artery forcep is a real blessing. Also for grasping and removing the ligatures used in tying the rubber dam, the braided silk now so generally used for wedging teeth, the little wire bristles placed in roots before X-raying, etc. It may not be needed for any of these uses once a week, but there always comes a time

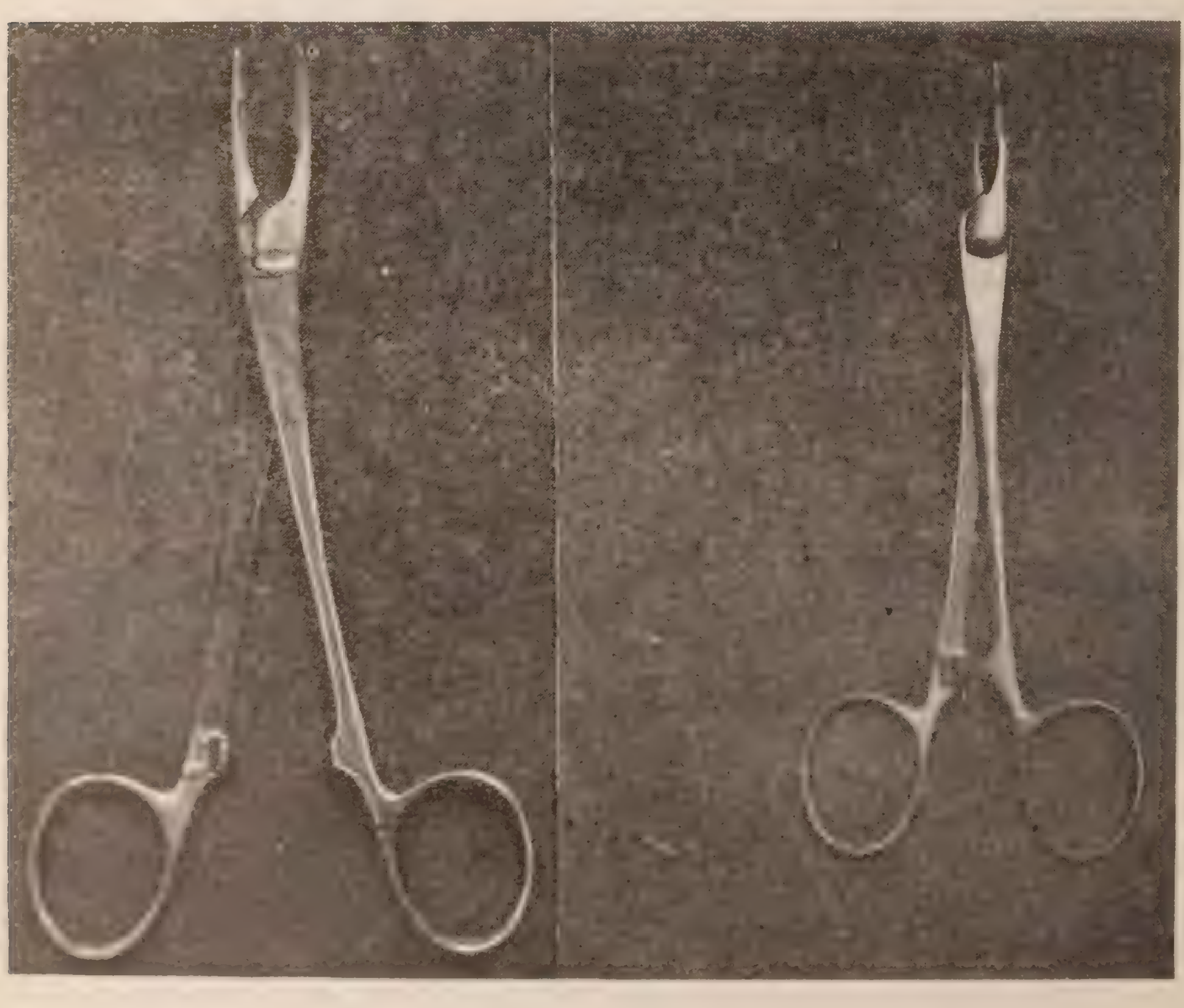

Fig. 3

when it is worth its weight in gold. It can be had of any surgical supply house at a trifling cost.

AN X-RAY OUTFIT FOR THE BUSY DENTIST

All dentists have come to realize, in part at least, the great value of the X-ray in dental practice, and are availing themselves of its use in certain cases. But relatively few realize that it is indispensable in every-day practice, that this need cannot be met by the specialist to whom we may refer our patients, or that an instrument is now available which is almost fool proof and which any one can learn to use in such a way as to meet every requirement of the most exacting practice. I refer to the Waugh Unit. This instrument is made by Waite & Bartlett, of New York, costs $350.00, with 5% discount for cash, and can be used on a direct or indirect current. It is twelve inches square, forty-six inches high, not including the tube stand, which is attached to the top. It is an attractive piece of furniture, made in oak or mahogany and placed on casters to facilitate its movement to any position about the office. A dark room can be extemporized in any dental office and the office assistant taught in fifteen minutes to do the developing. After the machine has been installed, the actual cost per picture is less than ten cents. I have two of these machines in my office and have found them so useful that I would not part with them under any circumstances. My experience has proven that it is impossible to do good root work without their aid: In fact, it is not too much to say that it is impossible to do good dentistry in all its branches without it. They have been so perfected that no one needs be without one.

59 West Forty-Sixth Street.

DISCUSSION

Dr. D. Austin Sniffen, White Plains, N. Y.: We have all been pleased and I know have received profit from Dr. Merritt's admirable paper, for anything that helps to make the day's work easier is welcome by the busy dentist.

We all have our pet instruments, I suppose, and in our hands they are useful, but do not always find some other fellow's pet as useful. I heartily agree with Dr. Merritt that cleaning is often carelessly done, and indeed it is not easy to remove all the deposits, and we cannot always demand fees adequate. I use a set of instruments similar to those mentioned, and find them very effective, but I have often wished some one would come along and give us a set of instruments to use on the engine with a slight piston stroke similar to the engine plugger. A set of instruments of this kind, I think, would fill a long-felt want.

Would not the cavity lining of gum dammar, zinc oxid and Canada balsam be a difficult one to prepare, and is not a material with some antiseptic properties better? I have found an antiseptic cement composed of oxid, zinc, aristol, lysol, eugenol, carbolic, thymol and formaldehyde very effective and very easy to use. As sensitive dentin is usually found at gum margins where isolating the tooth with the dam is difficult, is not carbolic acid or nitrate of silver better than forty per cent. formaldehyde? I have never used formaldehyde in this way and do not know its action on sensitive dentin, but I certainly will give it a trial.

I have used calxine mixed with the essential oils for temporary fillings in sensitive teeth and found it very effective, but I should think oil of cloves and zinc oxid would make a splendid temporary filling for sensitive cavities, and it has the advantage of being easily removed.

I would like to quote from Dr. Tousey on "Malocclusion:" "Pain, similar to that of chronic alveolar abscess, and very slight radiographic indications of apical irritation, may occasionally be simply the result of constant pressure, this tooth alone making contact with the opposing teeth when biting or chewing. The dentist can remedy the cause by regulating the teeth slightly or by grinding the surface of this tooth or the one it collides with. This explanation of the case should be accepted with more than the traditional grain of salt. Of course, if the pain ceases and the radiographic appearance becomes normal, that is all that can be desired. But if more or less discomfort remains and the radiographic appearance continues distinctly abnormal, the case should not be temporized with even though the usual tests by the dentist indicate a vital and healthy tooth." (He then refers to a case under expectant treatment): "The symptoms and radiographic appearance at the start were as described above. Grinding the surfaces of the opposing teeth did away with their collision, but the discomfort and abnormal radiographic appearance persisted for years. Then there was an attack of intense pain, necessitating the use of morphine and accompanied by swelling and suppuration. This requires months of treatment through the root canal. The treatment of just such a case should, according to the author's view, consist in drilling into the tooth and removing the dead or dying or simply chronically irritated nerve. This should be done before its putrid decomposition has poisoned the alveolus or bony socket almost beyond recovery."

Dentalone is a splendid preparation and I have used it for some time. Phenandyne I have never used, but will order it at once if it is obtainable now, for I think we have all been in a position where a local anesthetic other than cocain was needed, and the removal of deposits far under the gum margins is very painful. I have had personal experience in feeling just such sensations. I am sorry Dr. Merritt made no mention of autogenous vaccination with a bacterial culture of the pus in the oral cavity in his treatment of pyorrhea, as I would have liked to have heard his views regarding it. To my mind it has a very important bearing upon this subject and I have found it very helpful in fighting stubborn cases of pyorrhea.

I suppose more has been said about the family tooth brush than almost any subject connected with dentistry. The brush mentioned in the paper may act as a substitute to something better, and I think the essayist is not wholly convinced that his brush will, even when carefully handled, do all we would wish. I have often been inspired, as all of you probably have, to invent something perfect in this line, and once or twice it seemed as if the world was to become benefited, and I was to amass a fortune, but alas, it has never come. A rotary tooth brush is the solution, but how—think it over.

On the subject of radiography I heartily agree with Dr. Merritt and no office should be without access to an X-ray apparatus. In many cases I think we should refer our cases to the specialist. An instrument such as the one mentioned requires twenty seconds' exposure, and to get fine details it is difficult to keep the patient still so long.* A more powerful machine will take a picture in four seconds; this I think is a great advantage in many cases. I am perhaps more fortunately situated than some, as I have an X-ray specialist in offices immediately adjoining mine, and all my cases are taken by him, with a machine that cost probably $2,000, but the $350 machine should be in every office; and do not lose sight of the fact that we are dealing with a dangerous factor and never should be used as a plaything. Many have lost not only important members of their bodies but their lives as well. For protection, either a lead glass cradle to hold the tube together, with a lead-lined diaphragm or a lead screen behind which the operator stands, is essential; cost of screen, $50 to $85. It is also impossible for a novice to judge the vacuum of the X-ray tube and it is an easy matter to ruin tubes, which are an expensive item.

I would like to add to the original $350 expense, a coil or transformer, $80; two Tungsten target tubes, $50; adequate protective device, $10, and, very essential, an examining or illuminating box for the proper reading of the film, $15; and dark-room accessories (amount unknown)—and dark room is not as easy to make as would appear.

I have enjoyed carefully studying Dr. Merritt's paper and anything I may have said is not said in the spirit of criticism, for I think every point he has taken is well taken, and those

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*This is a mistake. Two to four seconds exposure is all that is required.—*Author.*

who know Dr. Merritt and the sincere character behind his work will vie with me when I liken him to a very famous workman.

It was the thought of old Stradivarius, the violin-maker, that since a Divine power had put the strange harmonies in the strings and cavities, he who so combined the conditions as to make the best instrument was in reality nothing less than a partner with the Infinite. It is no wonder that George Eliot, in her "Stradivarius," should exalt the man's dignified thought of his work. She represents the faithful artist as saying:

"Who draws a line and satisfies his soul,
Making it crooked where it should be straight?
An idiot with an oyster-shell may draw
His lines upon the sand all wavering,
Fixing no point or pathway to a point;
An idiot may remove, may choose his line
Straggled, and be content; but, God be praised,
Antonio Stradivari has an eye
That winces at false work and loves the true;
With hand and arm that play upon the tool
As willingly as any singing bird,
Sets him to sing his mourning roundelay,
Because he likes to sing and likes the song."

THE CORRECT WAY TO DETERMINE YOUR NET INCOME*

BY W. J. HOLROYD, D.D.S., PITTSBURGH, PA.

I HAVE A MESSAGE for you: During my lectures in different parts of the country, I find by personal observation and inquiry that there is a wave of feeling against the present-day methods of practicing dentistry viewed from a business standpoint—a bitter complaining that more help was not given to the student in dental college, and a regret that something definite and practical has not been done along these lines by the societies at large for the graduate student.

You know, I know, we all know that a young man takes up dentistry to better his financial and social condition; if he felt that he could not do that, he would not have quit his former vocation, because human nature tends to an upward development instead of downward. Therefore, there is nothing philanthropic in his initial motive when he thinks of taking up dentistry, but when he gets fairly launched in it, he finds he is hidebound by conditions which from the standpoint of getting a living are not based upon common sense.

His teachings — as you all know — are that the money end of things will take care of themselves—that prices are self-adjusting—he is imbued with the idea that he is above money—that his title of D.D.S. makes him and puts him above the sordid thinking of money, and if he dares to ask about the relative prices of operations he would be and he is waved to one side. This is a decidedly wrong attitude to turn a young man out into the world with.

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*Read before the Lake Erie Dental Society, 1916.

The request has been made quite a number of times that I cover this subject in one article. This is a difficult thing to do as it really should be spread over a course of lectures, entailing concentration and night study; but I will endeavor to cull the essential facts and present them to you on a working basis. But, in order that you will appreciate the importance of this subject more, we will together, from a bird's-eye view, so to speak, find exactly what position we occupy in the business world, how we are regarded by the outside people (who are the true court and give us our relative standing in the community, no matter what we think of ourselves), and I want you to keep this neutral viewpoint in mind, for a short time, while we analyze ourselves. This will put you in a receptive frame of mind for what is coming later.

It is a good thing at least once a year for every dentist to adopt this policy and stand aside and look at his place of business and his methods as if they belonged to some one else, and pick out the things this fellow has left undone. Sticking to yourself and being too close to your work, sometimes narrows a man's vision and makes him overlook important things. You can do and practice a wrong thing or method day after day, and think it right because of constant repetition; but to get this unbiased judgment as if you were some other person, will help you out wonderfully, to rectify these matters. If you keep to yourself you suffer a mental block. Don't think the longer you have been a dentist the better you are. We are now on the outside looking in—examining ourselves from outsiders' standpoint.

We find, by contrast and comparison, many good and sufficient reasons why we should study business methods more closely.

Looking about us on the outside business world, we find a progress almost appaling, passing us dentists by, as if we were standing still. The tremendous buildings going up, the enlargement of stores and plants, the enormous amount of initiative and executive ability that it requires to see these things through, and we note special training methods for men who have to handle these things; a balancing of education, so these men can direct matters properly with a full consideration and understanding of the proper proportions of production and salesmanship.

We see schools of all kinds, giving the proper training in their vocations, and on the other hand, schools of salesmanship and business direction by the score at every turn. Noon luncheons and talks along these lines which are helpful, and show the signs of the times. Life is becoming more complex and a man has to know all these things twelve years sooner than our fathers knew them. Our fathers got experience by hard knocks and gloated over them, but the price paid for some of this experience was too high and sometimes resulted in the death of the individual.

Now the new way is to accumulate the experience of others and mass it together and hand it in the concrete to the student to apply, eliminating the pitfalls, and by statistics reducing the liability of failures to a minimum.

This is a big help to a young man of today, and has been done in almost every vocation but dentistry. (Remember, now we are speaking from a business standpoint.)

Our business policy has been a joke for seventy-five years; and in the face of marching events it behooves us to consider, solve and remedy these conditions in our own practices. It is only too bad that some of this work was not done by our forbears in dentistry. It makes it doubly hard for the ones doing the work now, as they have to combat precedent, foolish ideas, a standing pat on the old methods of doing things, a hypocritical conception of applied ethics and many other things, which block the wheels of progress.

I will here outline some of the reasons why we should be quick and get down and study this subject:

In the first place, from insurance companies' standpoint we are regarded only as a second-class risk. On account of working over people, with all kinds of diseases, they contend that our liability of contagion and infection is heightened, which is true. Therefore, our death rate is somewhat higher than other vocations and as a rule we do not live as long.

Our profession is purely personal—when we stop, everything stops. We cannot have a corps of clerks to carry on our business—even to make expenses, and should we get ill, our office is non-productive for the time being, and in addition to that expenses going on and nothing coming in.

Our inability to handle the assistant problem successfully is another significant reason.

Our family cannot sell out a so-called established business when we die. All that can be sold is our outfit at twenty-five to thirty-three per cent. of its value. There is no such thing in our profession in America as "good will." Such is the fact in Europe, but not in America. I'm speaking now in general, not the exception.

We have no wholesale dealers to help us determine our correct prices for different kinds of work. Druggists, haberdashers, hardware, cigar dealers, have determined for them, by the manufacturers, the set prices of respective goods to the trade. That is a considerable help, because it at least establishes a minimum. Our prices are determined by the public mostly. They tell us what they want to pay. We grab what they give us and let it go at that, because we don't know how to apply our overhead expenses on to the finished operations, and until we know this we will continue to let the public pay us what they choose.

No successful manufacturer allows his patrons to do this. Don't let the public be your boss.

Every manufacturer places his prices scientifically, and the public pays, and he knows enough to let them walk out, if they won't pay him a profit.

The dentists works *under* cost sometimes and *doesn't* know it. The manufacturer *knows* when he is selling at a loss.

Don't sell your time at a reduced price—ask full price for it. You are not conducting a dispensary. It is unfair to yourself and family and there is no necessity.

Make your patient pay your *overhead* and then pay you a profit. You and your wife have to do it with the articles you buy from the other fellow. The public will not pay unless you ask them. You won't pay the shoe dealer $6 if he only asks you $4. Make the public pay you your profit in your vocation. But this must be done fairly and scientifically.

Another reason why we should study this phase of the profession is that we are not helped in college one iota. The student's former vocation, before he took up dentistry, did not tend along cost-keeping lines or assuming the responsibilities of business (that was generally assumed by older heads). They had absolutely no training along those lines and are turned out on the world to work out their own salvation. The result is dissatisfaction, wrong points of view, wrong interpretation of ethics, reverting to other callings and chaos in general, which could be avoided if the proper understanding of applying overhead and the right way of determining our *net* income was understood. All this trouble and dissatisfaction is brought about by this subject not being taught in the colleges.

I have been criticised for taking this standpoint, with regard to the taking up of business courses by the colleges, but on the other hand, I have received numberless letters upholding me in my attitude.

But I see the handwriting on the wall and I know it will come—it has to come, and the college which adopts it first will have the advantage over all the other colleges—everything else being equal.

We pay a price for everything we get, directly or indirectly, but the price the dentist pays for this business knowledge is too great. A class of fifty men will lose $50,000 in ten years in not knowing how to collect and will lose $100,000 in ten years by not charging a living fee for their work. It takes from eight to ten years for them to wake up, and those years are too precious to lose. They constitute a large slice of the dentist's working years, but it is never too late to mend, and until the colleges cover this subject we have to depend upon the study clubs and the help from the manufacturers, who are now entering the field And the dentist who gets down to these rock bottom fundamentals of business is going to win out and have a compensation for old age. I cannot make this too emphatic.

The dentist, after graduation, is content to sit back on the job satisfied with the bare fact that he has gotten through, whereas if he viewed the conditions in their true light, he would realize that things were only just starting. He lacks the spur of the overhead boss who, if his force do not get results, discharges the individual offender.

The average dentist closes his books gladly, sits down for what he thinks is a well-earned rest, and conducts his livelihood in a sloppy, slipshod way, which is the laughing stock of all men in other lines of endeavor.

This is all the more *non*-excusable for the fact that dentists have demonstrated that they are capable of this effort, a fact just shown by their having gone through college and are supposed to be now educated men. But as a mass they are content to rest on precedent, on old sayings and doings, which are out of date and do not fit in with the present scheme of things.

Any man who does not realize that fact, after reading and coming in contact with the present doings of the world, must not be surprised if he is left hopelessly behind. Every walk of life perishes, if it is not conducted on this new system of things. And to sit back in so-called superiority (when for a fact the average dentist has not an extra dollar in the world) demonstrates nothing except hypocrisy.

Credit men regard us as bad risks and some office buildings do not want us as tenants.

There are three ways of conducting a business:

First: Using too much business to push a bad article.

Second: Using too little business to push a good article.

Third: Spending fifty per cent. time on business and fifty per cent. time in producing a good article; in short, a fifty-fifty policy—which is the safest and sanest and the only kind of a policy that wins out in the long run.

I would advocate a more perfect balancing of the two phases of our profession and the benefits would be more far reaching for both the public and the dentists.

A man who takes up any vocation for a livelihood should study the business end of it. He is foolish and not fair to himself and family if he does not. Any man who assumes payment of bills, money responsibilities and protection of family, is not upright with himself and the world if he does not study the business phase of his vocation.

It is time that something should be done and something definite applied when a man quits a former vocation—studies dentistry three years—and then at the at the end of ten years can make only $1,250 net out of his practice—which is the average.

Although there are a hundred more reasons, I think the one above sufficient why we should study and continue to study(as conditions year by year change) the business side of dentistry.

We will now enter upon the subject matter and take for instance a dentist who wants to earn $2,500 a year net.

I will make it as simple and clear as possible and speak mainly in even figures so as to make it more easily understood.

The dentist naturally asks: "What shall I do first—how shall I go about it?" First, get your yearly expenses, or "overhead," as the cost experts call it. Overhead is any expense that is caused by your being a dentist. If in doubt as to whether you can charge any given expense against your practice, ask yourself, "Would I do it if I were not a dentist?" You can then tell whether you can legitimately put it down as expense against the business.

It must be said in favor of dentists, therefore, that they have been paying out of their own pockets expenses that should honestly go against the practice. Fooling themselves as to their net income or earnings.

I will now refer you to the sample expense sheet or overhead expense.

I have gotten together all the descriptions of expense I have seen published and have spent a lot of time getting them under eleven separate heads, in a comprehensive manner. The reason I have gone so much into detail is to emphasize and drive in the importance of the fact that there are so many channels of expense. All those items have to be paid before there is anything left for you. The sub-heads are self-explanatory, and if followed out will give any dentist a quick idea of where his money is going. I have never seen a group of expenses gotten together under sub-heads, in detail before. Any improvements will be gladly accepted. A dozen or more men can get together and each have a book printed. The information you will get from it is well worth it. It will show the "leaks."

Second: Put down your desired salary—say $2,500.

Third: Now take stock of your office. Estimate what it cost you to equip your place of business:

Operative equipment.
Laboratory.
Furnishings.
Instruments, etc.
Partition.
Plumbing, etc.

Say this costs you $1,750—you must take off ten per cent. yearly for depreciation as follows: $175.

Cost of education, $3,000.

The two above items, viz.,

Education	$3,000
Equipment	1,750
	$4,750

constitute your stock in trade and really means so much goods on the shelves, so to speak, and you must charge six per cent. per annum on this investment, viz., $285.00.

Fourth: This fourth point must be carefully explained. If a merchant has $3,000 worth of goods, he charges against the goods six per cent. per annum, but he can also get his $3,000 back in cash when he sells his stock.

We dentists can only get our $3,000 worth of education back in installments—say four per cent. per year, or $120 each year for twenty-five years in practice. Charging to our expenses $120 a year for twenty-five years makes $3,000 the point where we get the price of our goods back, so to speak. This makes another item of expense: $120.

Understand, this last item, $120, is distinct and separate from the six per cent. item; $285 is the interest on your investment and the other getting your goods back by yearly installments—$120 each year.

Read this over until you understand it thoroughly.

Compiling the above data so far gives us a table of:

Yearly salary	$2,500
Yearly expenses	2,000
Ten per cent. depreciation on equipment	175
Six per cent. interest on investment	285
Four per cent. reimbursement	120
This brings the total expenses for the year	$5,080

Next: Get your actual productive hours per year. Not your total hours in the office, but the actual hours that you can charge for.

There is a tremendous leak here. Much more than the average dentist dreams of. The dentists as a body have not figured this out and only a few here and there have gone to the trouble. The writer has kept account for three years and compared results with Dr. Clapp, of New York, who has done considerable investigating in this matter, and the consensus of opinion of these men who have done this compiling is that 1,000 hours actual productive time is correct, for the mass of dentists. Here and there you will find a man of strong constitution who will work longer, disagree with these figures, but he is the exception and not the rule, and we cannot make an argument of an exception.

In these articles the spirit is to take the subject *en masse*. If any man is skeptical, do not let him say any figures are not so until he has investigated and not guessed and in a simple way to decide these 1,000-hour figures for himself, is for him to keep his day book in two columns—first column productive time, the second column non-productive time. Let him keep this book thoroughly for at least a year and then we will entertain his arguments. Tell him he must accept the figures of the men who have kept these statistics.

I have done my best to cover this subject of actual productive hours in a separate article, published in the *Dental Digest*. So we will not go into the subject further in this lecture.

Accepting, then, 1000 hours for the working out of this present problem, we now divide the total expense ($5,080) by the productive hours, viz., 1,000, giving $5.00 per hour.

What next? We have now to time our different operations, and to get about ten average times of each operation, to give a fair estimate on that operation. For instance, twenty amalgam fillings gave an average of thirty minutes, which, at $5.00 per hour, would cost $2.50 per filling, if we wish to make $2,500 per year, according to the figures in our above problem.

The trouble that I encountered at this stage of the investigation was that there were no charts on the market that I could accomplish this timin; and at the same time keep track of all my work at one entry.

I will now refer you to the special ledger sheet and timing sheet combined. It takes care of all your work and at the same time, when you get through, it gives you information about each separate operation. Most other charts give the time of all your work in a lump and do not provide space enough to write things down.

This ledger chart combined with the little yellow laboratory time chart, gives you all the time information necessary. If you will only be fair to yourself and put your time down—put your laboratory time down also on the ledger sheet—get it from the yellow slip. Any ordinary mechanic has to do that for his timekeeper to make up his wage and if he can do it, so can you. Remember, every sitting is a sale. The same as if you sold a shirt or a pair of shoes and you should put the time of every sitting down.

After you once get the habit, it's no trouble. The price of every commodity is based upon time. You are pay'ng on that basis every day for everything you buy. If you do not know how much time it takes to do any operation from your averages, you cannot give estimates intelligently and you are only guessing.

From this point you can take the results from the ledger charts and fill in the sheet I have designed for the averages, at the back of your book. After a while you will have quite a few "times" to take your average from.

It is handier to keep the records in pencil, and from this point on you will begin to see light.

You can gradually fill out the different operations automatically, because it will practically be done at one entry and you cannot get away from that. Then you will see unfold information which you have required for years and never got. You will not need anyone to ask you to raise prices, you will do it yourself. Estimate every piece of work, as if you did it yourself. You will have to do a few pieces of work of every kind yourself so as to get the right basis.

I cannot make you do these things. I can only point out wherein before you have been wrong, and it is up to you whether you want to improve it or not. Everything has been done for you except your own timing and no one can do that but yourself. A great deal of time and expense has been gone to to get these charts together to help you out and any man who doesn't follow these principles is on the wrong track. Any cost expert will tell you that.

There is nothing new in the principles laid down, for they have been practiced from time immemorial by successful business men.

The dental profession as a whole has been resting back in sunny complacency with regard to their business campaign. Satisfied to muddle through somehow, come-a-day, go-a-day sort of existence, the exact antithesis of what is demanded by business. I have opportunity of watching the way some business clubs work, the way they marshal their forces, and I am decidedly impressed by the way they make things move in a short time by the efficient manner in which they get results.

The idea in this article is to stimulate interest and not prejudice. To know where you are heading—to follow some definite policy. Isn't that better than the old haphazard way? To have men look up to us as a successful profession, then we can get the best brains into it. We are only the keepers of those who come after us. Make yourself into a committee of one and start this campaign for your own satisfaction. It will take you a year to find out where you are at, and if you let it lag, you'll be dead before you get the benefits.

You have been held so far by the tyranny of environment and precedent and you want to be strong enough to burst its bonds. That's the truth, and we must face it, and there is not much to men who are not wiser today than yesterday, and it is surely axiomatic that to earn something you have to learn something. The fact that we have been going on the wrong track for years does not say that this generation is going to continue so—far from it.

For seventy-five years the profession has not studied the business end of dentistry scientifically, and to broach this subject at all is like butting a stone wall. We have precedent and environment to deal with, and they are awful barriers. Lawyers will tell you that.

We have to convince men who have been doing things for so long that they are ossified and are very hard to move. As the old Scot says, they are very set in their ways; and there is still a trace of the old witch-time left, that any one who suggests new improvements is stoned. The mental receptive attitude of a dentist is a big factor, before these different problems can be settled. A business man would jump at the enlightenment, but a dentist, not.

Failures, as described by Dun and Bradstreet, are mainly due to two things, lack of capital and mismanagement. What is mismanagement but ignorance? If a man is not ignorant, he will hardly mismanage. To know where you are losing money and where you are making it is good management and only keeping everlastingly at these problems will bring success.

The trouble is that anything that requires much mental effort never becomes popular. But any man who devotes time to these problems will see a surprising difference in his pocketbook. That is the law of compensation.

Remember, titles are but empty names and don't get you anything unless you apply business principles. No one is going to hand you any money because you are a D.D.S. When you give away service below cost it is easy to get patients, and when they are so dead anxious to buy, then is a good time to find out what you are giving them. Any one can be busy. The main thing, though, is—are you saving any money?

There seems to be a prevalent feeling that the less a man attends to business the better dentist he is. Not so. A dentist has a better opportunity to become a better dentist if he attends to his collections. Knowing his estimates and how to put things on a paying basis. Then he does not have to work nights, Sundays and holidays, and has money for post-graduate work and conventions.

Why there is still an element remaining of this class of men who have enough influence to hold things back is only regrettable, because in time they will have to give way in the progress of things. None of their arguments hold water. A dentist is not a better dentist because he does not keep books. If he does keep books that does not say that he is less of a humanitarian. In fact, the probabilities are that he is a better dentist and in a much better position to give charity judiciously, if he handles his practice in a business-like manner.

It is regrettable that any opposition for the betterment of conditions for the dentists should come from a so-called educated body of men, whereas in the olden times it was blamed on the condition of the uneducated masses. We read with derision of these conditions existing when we read history, but these conditions still are here, but it does not stop the going ahead of the enlightened few. And in closing I may say that expenses have gone ahead of compensation and it is up to us to remedy things as soon as possible in an intelligent manner.

DENTAL CONDITIONS AFFECTING STATE TROOPS ON THE BORDER

BY DR. R. IRWIN PARKER, BURTON, OHIO

ON AUGUST 28th, 1916, I was commissioned First Lieutenant, Dental Surgeon, and assigned to the Fifth Ohio Infantry, and immediately left for El Paso, Texas. Upon my arrival I set to work to remedy dental conditions which I found deplorable. I requisitioned a dental outfit, but up to the time I left, which was December 1st, 1916, I had not received same.

On calling at the medical supply house several times, I was informed that the dental equipment was ordered six months before, but had not arrived, and the same thing was told me at the time I resigned and left for home. There was absolutely no necessity for me having to wait so many months for the dental equipment, and after I arrived home I received notice that the equipment was ready for me. What can we expect from so much inadequacy, indiscriminating, inefficient red tape?

The state troops I found were suffering from all forms of dental lesions; however, everything possible was done for them under the existing conditions.

I experienced so many difficulties in trying to give the men proper dental treatment, that it was discouraging to say the least. Had I not taken along a few of my own instruments, I could not have rendered any aid whatsoever. When I first arrived the men were very antagonistic, and called us doctors "Butchers," and other names, quite in keeping with the above; but later, through tact and a little courtesy, I gained their good will, and they realized that I was doing the best that I possibly could for them.

The dental outfits furnished by the government, and selected by medical officers, show a lack of understanding as regards the needs of the dental surgeon. The outfits contain instruments which are never used—at least, I would never use them. The extraction forceps are antiquated, and so are other articles too numerous to mention. I told one medical officer that I could take the whole outfit and cut it down from five cases to three, and still have an outfit worthy of any first-class dentist.

Speaking frankly, I observed that too many dentists accepted their commissions as dental surgeons to the guard solely for the good time they anticipated, and considered the call an outing rather than one of serious consequence, the result being poorer dentists, and a never-ending friction between the troops and dental surgeons.

One dentist to every thousand enlisted men is hardly sufficient, and in this I am speaking solely of state troops, and why? Simply because the conditions requiring dental treatments are so great that one dental surgeon cannot adequately care for the work and do it properly.

With the federal troops, the enlisted men are required to report to the dental surgeon once a month. It is easily seen how one dentist can take care of the men and do so more correctly. In any case, one dental surgeon to every thousand enlisted men is not sufficient, and as a means to remedy this condition, state troops must be taken care of while they are at home as well as in active service, and a law should be passed to the above effect.

Referring again to the equipment, I say in all fairness that medical officers are not qualified to select the dental outfits, and to remedy this condition. the dental corps must be separated from the medical corps and placed in the hands of an officer of the dental corps who has recognized ability to handle the above, and until then we can never expect to have a dental corps that is in any way efficient.

The present law regarding the dental corps is not broad enough in scope; an officer must be in the service eight years before he can become a captain and twenty-four years before a major, and he cannot become either if there is fifteen officers of either rank in the service—he must wait until that number is reduced.

DENTAL CONDITIONS AMONG STATE TROOPS ON THE BORDER

BY DR. FRED C. MALONY, AUBURN, NEB.

DENTAL SURGEON TO THE FOURTH AND FIFTH NEBRASKA TROOPS

IN PREPARING THIS ARTICLE on dental conditions in the army, I will have to write things as they come to my mind, and they may be so mixed that it will be difficult to read; but if the reader will only have patience, I think he may find the facts that I am trying to bring out.

I was attached to the Fifth Nebraska Infantry while on Mexican border duty at Llano Grande, Texas. In the place where we were in camp there were the following troops, which we were supposed to take care of: Eight regiments of infantry, two batteries of artillery, two field hospital corps, one signal corps and the Oklahoma engineers. These were in our immediate camp. We also had the North Dakota infantry from Mercedes and the Iowa and Oklahoma cavalry from Donn, Texas. There were seven dentists to take care of this many men and one outfit to work with, which, luckily, a regular army dentist turned over to us. He was sick and had to take a furlough, so we had his equipment. That, you see, allowed each one of us about an hour and a quarter at the chair. We handled from forty to sixty patients each day, so you can see we could only do emergency work of the roughest kind and naturally some of the men who took pride in keeping their teeth in shape had to go to outside dentists for their work, regardless of the fact that they were supposed to have their teeth fixed at government expense.

The troops in our camp arrived in July, and in August they had but one outfit and one dentist for the entire camp; then a few more dentists started coming in. I arrived there on the first of October and immediately put in requisition for an outfit. Word was returned that the Allies had bought up all available outfits and that I would get mine just as soon as they could be bought. Think of it! After these men had been in service four months, we had no more dental equipment than this. I received my equipment about November 22, 1916, over seven weeks after I arrived there.

The equipment certainly did show that a dentist did not select it. While everything was what they thought the best, the instruments were not practicable. Hand instruments were all cone socket, and out of an assortment of eleven pairs of forceps, there was one pair that was at all practical. The chisels, excavators and mouth mirrors were things that we would not use at all in private practice. In fact, I never have seen instruments shaped like these or as large or unhandy. The government does not allow you to do any gold or porcelain work, even if the men want to pay for it themselves; consequently there are no instruments of this kind in the outfit and these men had to spend their money going to civilian dentists for treatment.

One other thing I want to mention before it slips my mind, and that is the subject of the tooth brush. On every Saturday there was an inspection of the equipment and these men were required to have a tooth brush of some kind—no difference what kind just so long as it had a handle with some bristles attached—and every little while they had medical inspection to see that the body was kept clean. We had one partial dental inspection in seven months. Now the point I want to bring out is this: Why does not the government furnish these men with brushes, recommended by the dental profession, free of charge? They furnish tape and gauze for sore feet, and I have learned that a man can be a better soldier without any feet than he can by not having any teeth, or even an aching one; and you cannot blame a man for not paying fifty cents for a decent tooth brush when that is his entire day's salary. Would you buy a tooth brush for five or ten cents?

Let me say in passing that we made a partial examination of the teeth in our camp. In private practice we think that we see a lot of pyorrhea, but, gentlemen, unless you have been in close contact with a body of men as we were under these conditions, you don't know what pyorrhea is, nor do you know the terrible ravages of this disease. I believe I would be safe in saying that ninety per cent. of the men in our camp were affected with pyorrhea, and it was not possible to do a thing for them. I personally examined over five hundred men during our inspection and kept careful note of all work which was needed, but I am sorry to say at this writing these notes have been misplaced, but the figures themselves were so amazing that I would not try to guess them because there is not one man out of ten who would believe my statement even if I had my notes to prove them.

I was asked if I thought one dentist with every thousand men was a sufficient ratio. Under present conditions of the army dental corps, it is *not*. If the conditions were remedied (which could easily be done) one dentist would be sufficient. The conditions that would have to be remedied are the following: A dentist on the Physical Examining Board. Every man should be put through as rigid an examination by a dentist as he is by a physician, and be turned down as quickly, or more so, on account of a bad condition of the oral cavity as he is for a vericose vein. Next, the dental corps should be a separate organization from the medical. It should be given its proper standing as an indispensable unit by having as high officers in the dental corps as we have in the medical corps, which we have not at this time and never will have until the dental profession as a whole takes an active interest in this movement.

All these things I have mentioned could be remedied by one plan very quickly, and that is a law or rule, or authority, being inserted in the Army Regulations allowing a dentist to rise in rank a good deal more quickly than he can now. By that I mean going up, filling vacancies. The first thing we need is a competent dentist in the Surgeon General's office, vested with a good deal of power and then we would quickly see a great change. There would be a dentist buying supplies, a dentist on the Examining Boards, and one dentist would be accountable to another dentist higher up instead of to a physician. One more thing I want to say, and I know that it is so, is that until the dental corps is on an equal footing with the medical corps there will be a dental corps in name only. To prove this: While in service some one tried to start a Reserve Dental Corps. They could not do it, for we were all of the same rank and there was absolutely no chance for advancement. There is no dental corps and never will be until the things stated above come to pass.

The dental office was in the farthest back room of an old hotel now being used as the Camp Hospital. I expect that room was 12 x 14 feet. Of course, when my outfit came there was not room in there for two chairs, so I was placed in the back part of the dispensary, and on windy days and cold days I had to stop work. Later on, in January, there was a little shack put up for a dental office which would accommodate two chairs. But by that time the men were so disgusted trying to get dental work done that we did not have many patients.

Until the dental profession recognizes fully the conditions and takes some steps to remedy the same, matters will remain at a standstill. *When the medical profession think they need something, they go after it and get it.* Why don't we do that? Haven't we got the nerve or don't we take interest enough in the matter to realize what it means to the dental profession? I personally will help and assist the dental corps of the United States Army in bettering themselves and by that means doing our government and troops an inestimable service.

Typhus Fever

In a paper read at a meeting of the New York Medical Society on "Typhus in Serbia," it was mentioned that preventive treatment consisted in the thorough de-lousing of all patients within the hospital and prior to admission. Where there are no lice there can be no typhus. In treatment, reliance was placed on good nursing and keeping the patient quiet and free from worry. A liberal soft diet was allowed and fluids were forced upon the patient. When the heart muscle began to weaken digitalis was given.

Homeopathy Redivivus

In a paper in the *New York Medical Journal* it is said that the cure of disease is brought about by placing the exact toxins that cause the symptoms in healthy tissues. In Fairmount Park, Philadelphia, and Bronx Park, it was the custom to make the employes chew a few leaves of the poison ivy plant, when clearing away the vines, as a preventive of the well-known eruption. The exact, unmodified substance that caused the symptoms must be employed as the curative agent.

CONDUCTIVE ANESTHESIA FOR THE GENERAL PRACTITIONER*

BY F. W. ROUNDS, D.D.S., LOUISVILLE, KY.

PROFESSOR OF ORAL SURGERY AND ANESTHESIA IN THE LOUISVILLLE COLLEGE OF DENTISTRY.

THE DREAD of pain during surgical procedures is inherent in the human race. Throughout the recorded histories of all peoples are seen evidences of attempts at its alleviation. It is a far cry from the days of the Pharaoes to the twentieth century, but from those early ages to the present, pain has been held to be an arch enemy.

The crude efforts of the ancients in their administration of mandragora root, cannabis indica and other soporific drugs, lettuce leaves, frog's fat and Memphis stone, as well as their faith in incantations and priestly rites, have in these latter days given place to a class of pain-relieving agents known as anesthetics. It is to these agents that modern surgery owes to a great extent its present high place.

Modern anesthesia dates its beginning from the middle of the last century, and we as dentists are able to point with pride to the fact that to dental men the world owes a debt of gratitude. The names of Morton and Wells will ever be placed among the world's benefactors.

It is a regrettable truth that the dental profession has failed in the past to seize its opportunities in the anesthetic field. Our medical brethren were quick to grasp the significance of these important discoveries, and we as a profession were content to follow their leadership.

During the last few years, however, a great awakening has taken place among our profession. Partly due to the earnest efforts of our own investigators, and partly at the behest of a laity demanding more humane treatment, the dentists of our time are realizing that no operations performed on the human anatomy cause more drain on the nervous system, than those performed in the dental chair. Up to a comparatively recent period the dentist has not reckoned with shock; while on the contrary, one of the first aims of the surgeon is to obviate this catastrophe.

The fact that the laity now realize that dental operations may be performed painlessly, without subsequent fatigue and shock, has brought us face to face with an issue.

Either we must still carry out our time-worn practice of subjecting our patients to unnecessary pain, lassitude, misery, fatigue, shock and dread, and with it all lose our prestige as worthy members of the healing profession, or we must awake to the possibilities, grasp the means within our reach and make our services welcomed by the masses. It has been successfully demonstrated that this consummation is not a Utopian dream. We have agents at hand whose intelligent application will render our procedures painless. At the parting of the ways, are we not now to take the wiser course?

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*Read before the Tennessee State Dental Society, 1916

It is not in the province of this paper to discuss the merits of the many methods of painless operating. I am glad of the privilege, however, of presenting some data relating to the newest form of anesthesia which has been given to us and to offer its application as a safe and sane technic to the practicing dentist who desires to live up to the possibilities of his high calling and who has the best interest of his patients at heart.

The method to which I refer is the use of novocain and suprarenin in combination. Novocain-suprarenin is administered hypodermatically as a local anesthetic.

By local anesthesia we mean an anesthesia confined to a definite part of the body, in contra-distinction to general anesthesia, which renders the whole body insensible to pain.

Following the technic to be described in our clinic, we believe that local anesthesia is indicated, with a few exceptions to be named, for all operations in the mouth where pain is involved.

The anesthetic solution of novocain-suprarenin, if properly prepared and administered, is harmless in its effects and thoroughly harmonious with the tissues into which it is introduced. The impression prevalent in the profession that a local anesthetic is indicated only in surgical procedures is erroneous, and probably established because until recently cocain, a protoplasmic poison, was the agent chiefly used.

We have employed novocain-suprarenin in hundreds of cases, covering a period of several years to our thorough satisfaction, and with the heartfelt appreciation of our patients.

The list of operations performed under this anesthesia includes practically every type which comes to the attention of the dentist, both in the field of operative dentistry and in the field of minor surgery.

Objections have been made by the uninformed that the methods advocated consume too much time. We have found, on the contrary, that a far greater amount of work can be performed within a given period, with far less mental strain both to ourselves and to our patients, than when no anesthetic administration is attempted.

The contra-indications for its employment are as follows:

First: A local anesthetic must not be injected into a septic field, for it logically follows that by so doing septic matter is forced into healthy tissues, and the area of infection enlarged. Poor anesthetic results would be obtained by this procedure, for the inflamed area associated with septic structures does not readily yield to the drugs employed. This contra-indication can usually be obviated by resorting to conductive injections.

Second: False ankylosis presents the only contra-indication to conductive anesthesia in the mandible, which ever has come to our notice.

This condition demands complete relaxation, which can only be obtained by using a general anesthetic.

Third: Hysterical patients are not good subjects for local anesthesia; not from the view-point of danger but because of their mental condition they are unable to render the confidence and co-operation which are essential to successful results. For such patients we believe that a narcosis should be obtained, if the operation is of sufficient magnitude to warrant any anesthetic agent.

Bearing in mind these contra-indications, we can state with an assurance supported by ample experience that local anesthesia can be used to advantage in the following operative procedures:

Preparing sensitive cavities,
Extirpation of pulps,
Fitting of bands and matrices,
Exposure of pulps,
For immediate relief from odontalgia,
Abscess treatments,
Removal of crowns and bridges,
Cementing of crowns and bridges,
Preparation of abutments, etc.

In employing a local anesthetic to obtund teeth with vital pulps which are to be conserved, the operator must always bear in mind that the pulp is anesthetized but will return to a normal condition after the anesthesia has passed. Operative procedures on such teeth must be performed with due care against encroaching upon the pulps, else the shock thereby induced will destroy their vitality and cause after-troubles. In short, the same precautions must be taken as when no anesthetic is used. This caution should be particularly observed in preparing cavities and shaping abutments, where the heat induced by the bur or stone, or the removal of tooth structure to too great a depth, might easily cause disaster.

For surgical procedures, local anesthesia is indicated in nearly all cases which come to the general dentist. It is particularly useful in:

Extractions,
Curettements,
Scaling of pyorrheal teeth,
Root resection,
Cyst operations,
Tumor removals,
Bone chiseling,
Abscess treatments,
Reduction of fractures.

It is perhaps apropos to make a short comparison of local and general anesthesia; not to offer a brief favoring the adoption of one method to the exclusion of the other, but to present some of the advantages and disadvantages of each. We will then be able to judge which form of anesthesia will be most useful as the different types of cases present. No one method is fitted for all conditions, and in our opinion, the well-equipped operator should be competent to administer both local and general agents as the occasion may require. Our observation is that in every dentist's practice, cases present—some of which demand local and some general anesthesia. It appears, however, that in general practice, the indications for local administration are far more numerous than for general. The average case can be handled more successfully and with far less danger if the patient is conscious. With certain types, nevertheless, there is a decided demand for narcosis, even in operations of a minor nature, and agents are at our hands which render this feasible with a minimum of discomfort and risk. The chief aims of all anesthesia are to obviate shock and to facilitate operating, and our choice of anesthetic should be governed by a recognition of this principle. By local injections, properly administered, physical shock cannot occur, as the sensory impressions cannot reach the nerve centers, while under narcosis from our general anesthetics the danger of psychic shock is minimized.

Crile has successfully demonstrated a combination of the two methods, which he terms anoci-association: By obtaining the advantages to be derived from both local and general agents, he has marvelously lessened shock in major surgical cases. This principle often can be adopted successfully in operations in the mouth, by first using a local administration of novocain-suprarenin to cut off the sensory impressions from the operating field, and then performing the operation under somnoform or nitrous oxid and oxygen to obviate mental strain.

It is a recognized fact that a poor administration of a local anesthetic, while unsatisfactory, does not endanger the patient's life, while a faulty technic with general anesthetics, constitutes one of the chief elements of danger in their use. No one, however, should attempt to use a local anesthetic without understanding the anatomy involved and without scrupulous attention to asepsis. It is self-evident that no one unless thoroughly competent should employ somnoform or nitrous oxid.

For the general practitioner, novocain-suprarenin anesthesia presents the following advantages:

1. It is not dangerous to the patient's life.
2. Nearly all operations incident to general practice can be performed under it.
3. An assistant is not necessary.
4. The patient needs no preparation.
5. Little time is consumed.
6. The patient can co-operate.
7. A simple and inexpensive outfit is required.
8. It can be used on patients of all ages.

We cannot impress too strongly the necessity for asepsis in all stages of this work. By this, we mean that all instruments employed should be absolutely sterile, the solution thoroughly boiled, the operator's hands surgically clean, and the field of injection rendered aseptic. The neglect of any one of these precautions invites untoward sequelæ.

The operator should be absolutely informed also in regard to the anatomy of the structures involved in the operation, and should govern his procedure by this knowledge. Failure to obtain satisfactory anesthetic results is often laid to the anesthetic, when the sole responsibility rests on the operator.

A perfect technic is one of the chief elements of success. Knowledge of the structures involved is of no avail if the anesthetist is incompetent to utilize that knowledge in inducing anesthesia.

The personal equation must be considered in local as in general anesthesia. The attitude of the operator toward his patient, his powers of suggestion, his own confidence in himself and his anesthetic agent, and his ability to control any complication which may arise, all have an important bearing on the result.

Now as to the anesthetic agent itself, Braun, who has been termed the "father of local anesthesia," and to whom the profession owes much for his scientific researches in this field, has laid down certain definite requirements which an ideal local anesthetic must possess:

First: It must be harmonious to the tissues into which it is injected.

Second: It must be less toxic than cocain.

Third: It must be soluble in water and its solutions sterilizable.

Fourth: It must combine readily with suprarenal preparations without influencing its anesthetizing properties and without affecting the action of the suprarenin.

Of all the substitutes for cocain, and they are many, novocain, discovered by Einhorn in 1905, fulfills these requirements best. It dissolves in an equal amount of water, forming a neutral liquid, which is incompatible with alkalies. It has the same anesthetizing power as cocain, possessing the same action on the peripheral tissues, but is very harmonious to them while the latter is not. There are no systemic effects noticeable after its administration in appropriate dosage. Circulation and respiration are unaffected, the heart action is not influenced and there is no increase in blood pressure.

Novocain combines admirably with suprarenin, and according to Braun, the effects of these two drugs are enhanced by their combination. Novocain is not classified as a habit-forming drug. It is possible, however, that the cocain habitue if deprived of his stimulation would resort to novocain and receive a similar sensation, hence it is included in the Harrison act.

Little attention need be given the dosage of novocain. Fischer gives the maximum dose as .5 grams, but four times that amount has been administered without any untoward symptoms. Prinz states that the average dose is .03 grams, which is one-half a grain. It is evident that it is safe to inject an amount necessary for any dental operation without even approaching the maximum. It is seldom that a dentist will be called upon to use more than one grain, and such a quantity can be used with perfect safety. The drug is commonly administered in from 1% to 2% solutions.

Novocain is six to seven times less toxic than cocain, and three times less toxic than any of the other substitutes. Novocain intoxication under a high dosage is relatively light therefore compared to cocain, although the symptoms are much the same.

Suprarenin or adrenalin is derived from the suprarenal glands of oxen and sheep. As used now, however, suprarenin is synthetically prepared, furnishing a more reliable, stable and purer product, which is less toxic than the organic drug. Adrenalin, as marketed, contains chloretone and thymol, for their preserving qualities, as alone it does not keep well. For this reason, Fischer, Prinz and others advocate the use of synthetic suprarenin rather than the organic product, claiming that the addition of these agents impairs its virtues.

Suprarenin is a grayish white powder, readily soluble in dilute acids, and slightly so in water. It is extremely powerful, being active in a 1 to 100,000 dilution. It is marketed in a 1 to 1,000 strength in a physiologic salt solution. Decomposition of the drug quickly takes place if it is exposed to light, heat or air. Tablets of novocain and suprarenin in the proper strength afford the best means of obtaining these drugs, as the suprarenin is more stable and keeps fresher in a dry form than in a liquid state.

The average dose of the synthetic preparation at a single injection is one minim of a 1 to 1,000 solution, and the maximum dose is five minims.

Suprarenin has no anesthetizing power, nor does it affect the anesthetizing power of the novocain. It is a powerful vaso-constrictor, thereby contracting the capillaries. An anemia of the field is thus produced which:

First, localizes the novocain solution, preventing its quick absorption, the novocain action being by this means intensified.

Second, hemorrhage is materially controlled.

Being such an active agent, the toxicity of suprarenin is relatively high. Its poisonous symptoms are chiefly palpitation of the heart and difficult and labored respiration, dizziness, fainting, and rapid pulse. Its toxicity seems to be lessened if the solution is made fresh from the tablets. Caution should be observed not to use too high a percentage of the agent in hysterical patients, in arterio-sclerotics, or aged persons, on account of the quick rise in blood pressure from it.

Tablets produced by the Farbwerke-Hoechst Co. have proved to be reliable and effective. The novocain and suprarenin in these tablets are sterile and pure; if kept from the light and air will remain fresh for an indefinite period. The use of stock solutions of the drugs or of ampules is not recommended. Their freshness is indefinite and the aseptic conditions under which they are prepared is uncertain. Suprarenin also is not stable for any length of time when in liquid combination with novocain.

One of Braun's requirements is that the solution shall not cause any tissue lesions. It must be so harmonious that no distention or contraction takes place in the cells. This property is called isotonia. If the cell fluids and the solution are of the same consistency; that is, if their percentage of salts is the same, then the solution will circulate through the cells without any change or injury to the latter.

When fluids diffuse through an animal membrane we have a condition known as osmosis. If our solution is weaker in osmotic pressure than the cell fluid, it is called a hypotonic solution; if stronger, a hypertonic solution, if of the same consistency, an isotonic solution. Should the solution be non-isotonic, unfavorable changes, such as tumefaction or dehydration, take place in the tissues. Plain, sterile water, for example, while it produces anesthesia, causes a swelling of the tissues, accompanied by pain.

It has been found that if the solution contains 0.9 per cent. of salt, that it is isotonic, and when injected causes no pain and no swelling, and that a quick absorption occurs, followed by a speedy restoration to a normal condition with no after effects. To be properly constructed, then, our solution for injection should be composed of novocain to produce a harmless anesthesia and suprarenin to limit its field and produce an anæmia in a vehicle of distilled water which contains salt in a strength of 0.9 per cent.

When salt is added in the above proportions we have what is known as a physiologic salt solution.

There is on the market a tablet known as the Ringer tablet, which contains the salt as specified, in addition to which calcium chlorid and potassium chlorid are added.

The calcium and potassium chlorides have been found to enhance the worth of the sodium chlorid alone as these elements are found in the blood. Clinically the use of the normal saline solution alone has given us the same results.

For ease in preparing our solution, however, the use of the Ringer tablet is recommended. If we add one tablet to 10cc of distilled water, we have an isotonic solution. Using this as our stock, we can add our novocain-suprarenin tablets to produce the desired strength. We are assured by this means of obtaining a perfectly fresh compound.

Among the chief objections to the employment of the proprietary and stock anesthetics are these: that many have not complied with the isotonic requirements and many also contain antiseptics which, as before noted, are contra-indicated on account of their irritating properties.

The equipment for successful results is simple, but must comply with the rules of asepsis. It consists of:

Syringes,
Dissolving cups,
Covered glass or porcelain tray,
A supply of Ringer tablets,

Needles,
Alcohol,
Distilled water,
A supply of novocain-suprarenin tablets.

The syringe must be of a type which is easily sterilizable, does not leak, and preferably is graduated for gauging the contents. The old style of syringes having leather washers does not fulfill the requirements, as they are difficult to keep clean, and are prone to leak. The Fischer, Record, Astra and Luer syringes are excellent makes. Each can be sterilized by boiling.

Immediately after use the syringe is taken apart, wrapped in gauze to prevent breakage, and placed in the sterilizer which is filled with cold water. The heat is then applied and the water is gradually brought to the boiling point. Sudden emersion in hot water will break the glass barrel of the syringe. No soda should be used, as a deposit would be left on the barrel. It should be borne in mind that alkalies decompose the anesthetizing solution. After sterilizing, the syringe should be allowed to cool slowly to allow for the difference in expansion of the glass and metal; the parts are then assembled.

The dissolving cups, which are made of porcelain, are of different sizes; one graduated to 3cc, and the other to 10cc. They are used to measure, dissolve and sterilize the anesthetic solution. Before use, each is cleaned with alcohol or dilute hydrochloric acid and rinsed with distilled water.

The covered glass or porcelain tray is kept filled with alcohol. It is used to hold the syringes and the needles.

The needles should preferably be of iridio-platinum. They do not oxidize, do not break easily, and can be sterilized by heating to a cherry red over an alcohol flame. When not in use they are kept in the covered tray. Five eight-inch needles are used for infiltration anesthesia, and a one and one-fourth inch needle for conductive work. If a steel needle is employed, it should be immediately discarded after the injection and a fresh one substituted for the next operation. Steel needles rust easily and are difficult to keep in a sterile condition. Their use is permissible, however, in infiltration anesthesia, but for the beginner, especially, the danger of breakage is serious in conductive injections, especially on the mandible. The iridio-platinum needle bends if it strikes an obstruction, while a steel needle breaks without warning, generally near the hub. Blum and others use the steel needles altogether and have never experienced trouble with breakage.

Seventy per cent. alcohol is the agent we have used for keeping the instruments clean between operations. If kept well covered, evaporation is slight. The use of Lysol is discouraged. Its odor is offensive, and it has a tendency to gum the syringe.

Care should be taken to have fresh distilled water at hand. If possible it should be kept in a non-alkaline glass bottle. If fungus growths appear it should be discarded. Some operators distill their own water. This procedure is recommended, as it insures a perfectly fresh product.

Novocain-suprarenin tablets are marketed in different strengths. They are bought in colored bottles and should be kept in a dark place, for exposure to the light as well as the presence of alkalies decomposes them. The tablets should be white in color. If the top tablet appears yellow it has been exposed to light and should be thrown away.

PREPARATION OF THE SOLUTION

The syringe is removed from its container and the proper hub and needle attached. Force the alcohol from the syringe and draw distilled water through the barrel several times to eject any alcohol which may be left. Alcohol, if injected into the tissues, causes a prolonged anesthesia.

The dissolving cups are rinsed with distilled water. The large cup is then filled to the 10cc mark with distilled water and a Ringer tablet added. This is now thoroughly boiled and gives 10cc of the Ringer solution. Reserve as much as is needed for the case, and to it add as many novocain-suprarenin tablets as are required to make the desired strength.

The solution is again passed over the flame until the tablets are dissolved. Too long boiling should be avoided, as it decomposes the solution and causes discoloration. The contents of the cup are now allowed to cool to about body temperature; draw the solution into the syringe, pass the needle, if of iridio-platinum, through the alcohol flame. The syringe and its contents are now ready for the injection.

The following precautions should be observed:

1. Be sure not to allow the solution to come in contact with anything except the dissolving cup and the syringe.
2. Use the solution immediately after preparing, for it is decomposed by continued exposure to light, heat, air and alkalies.
3. The solution must be crystal clear. If cloudy or pink in color a fresh mixture should be made.

Having now covered the major points relative to the materials used in this form of anesthesia, the next points for consideration are the anatomical structures involved and the technic of the injections. These phases will be covered at the clinic.

DISCUSSION

Dr. A. J. Cottrell, Knoxville: I wish to compliment Dr. Rounds upon this paper and would especially commend the manner in which he has treated the subject as to minute details. A discussion would really be out of place as he has adhered strictly to accepted methods in conductive anesthesia.

Let me say, however, that since the doctor has not mentioned the possibilities of this method of local anesthesia to those of you not familiar with it, his demonstration will prove a revelation.

It would seem to one who has not given the matter some attention that the doctor is over-exacting in his statement as to the requirements as to the aseptic precautions necessary in the care and use of the instruments, and the extreme care needed in the preparation of the solution. I wish to say that in his paper he has overstated nothing, and to omit any of the details he has mentioned so emphatically, would be to court failure.

You have just heard Dr. Rounds say that any tablet which shows discoloration should be discarded, the absorption of moisture from the atmosphere or any accidental source causing a decomposition of the suprarenin, which then becomes an active poison; this decomposition shows in the tablet by a change of color to a light brown. Let me emphasize this, the tablet should be and remain snow-white until fully dissolved, and the resulting solution should be perfectly clear.

Sometimes the glass tubes in which the tablets are furnished, become cracked or broken in transportation. I have invariably found tablets decomposed in this case, and the only safe plan is to discard the entire tube.

Let me emphasize this, as, so far as I know, I am the only dentist in this vicinity who has been so unfortunate as to use a spoiled tablet. The results are most alarming, and I hope none of you may have this experience.

Let me also impress upon you the fact that the doctor has not asked for too much in the care of the instruments. It would seem that such repeated sterilization would not be called for, especially to those not familiar with conductive anesthesia. But these injections call for a needle 25 millimeters in length, and you can imagine a needle carrying the slightest infection and going this deep into the tissues would certainly be serious. So what he has said in regard to asepsis is not overstated in the least.

Another poiut I would like to mention is this; you need not be afraid of the solution if it is perfectly clear and the proper care has been used in the preparation. Dr. Fischer, in his book, gives the maximum dose as 24cc of a 2% solution. That means 12 syringefuls, a quantity never required in any operation within the mouth. I have used as much as 10cc without any bad results.

Dr. Morgan asks as to its limitations. It has certain limitations. False anchylosis, as mentioned by Dr. Rounds, completely bars the use of conductive anesthesia. In many instances its use is barred by conditions purely psychological; this, however, might be considered a difficulty rather than a limitation, and can usually be overcome by patience and proper suggestion. Humanity has been compelled to submit to painful dental operations for so many generations, that fear of them has become sub-conscious, and many times to the extent that local anesthesia is contra-indicated altogether.

In my experience, the only serious barrier to the use of these drugs is idiosyncrasy, but this applies to all medication of every kind, and will be encountered no more frequently in the use of novocain and suprarenin than other drugs which we use constantly.

The technic for conductive anesthesia is very delicate and exacting, and at many points fraught with grave danger. My advice to all is not to attempt its use until the entire procedure is well fixed in mind, and then with extreme caution.

Dr. D. M. Cattell, Memphis: I, too, want to congratulate the writer. I believe it is the last word, so to speak, on that particular line of anesthesia, and what I want to emhpasize before this association is that it was not until Dr. Horace Wells, in 1844, first sounded the tocsin that there was such a thing known as anesthesia, a man who belonged to our profession, and whose name will always be honored; that it was a member of this profession who first started this great idea, and since his time there have come forward other thoughts on anesthesia. Dr. Morton followed it in a few years with the anesthetical effect of sulphuric ether, and so on down. Dr. Oliver Wendell Holmes gave us the name anesthesia. The dental profession has always carried the idea of the usefulness of the anesthetic in the profession. It is our profession that has gotten there first all along the line. Some of you remember the first local anesthetic—some man from down in southern Missouri—Van Something. He had a pair of wire tongs, with a little receptacle on either end of the tong, and in that receptacle was a little sponge, and when the sponge was saturated with some drug it was placed in the mouth on either side of the process, or either side of the root of the tooth, and rested there a few minutes; and from that it has gone on from one thing to another, every one of which has been introduced by dentists. I may be wrong—challenge me if I am—in saying that not a progressive thought on anesthesia has been presented to the world outside of our profession. Clear down the line until today, we are looked upon by the other professions, by medical men and the world at large, as the profession leading in this. So that every article which we have before an association of advanced thought should be listened to. It is up to us gentlemen, to keep in the front, and now and then when we can have such an exhaustive paper as has just been read, and others on other lines of anesthesia that will be read, we should listen; we should prepare ourselves to follow the instructions, and should carry on the good work and keep in the front. It is up to us to do it. (Applause.)

Dr. B. H. Johnson, Nashville: This is the one subject that I would love to discuss, but the time is growing short. I appreciate Dr. Rounds coming down here and giving us this excellent paper, and as the chairman of the Essay and Clinic Committee, I want to thank him as well as those who have responded. This subject is one that many are skeptical about, or at least they are afraid to use it. I have had some tell me that they have gotten the equipment, but haven't gotten up the nerve to use it. I do not see why it is. There are some few that have tried and have had some failures. I think it is like most anything that is proven all right, if we get the thing right and do it right, there will be no trouble. The old saying is, be sure you are right, and then go ahead. Of course there are some cases where it does not work out just exactly like we expect, but to meet complete failure, I do not know of a single case. In fact, I know I have not had a complete failure, and I have been using it for a long time, and don't see how I ever practiced without conductive anesthesia. I expect perhaps some day I may have some failure; I don't know. After we do these operations, these injections, a sufficient number of times and get practice enough, it is like going home at night and putting your key into the door—you don't have to feel for the keyhole, you know just where it is and you put your key there and unlock the door, while some one who is not familiar with it would have to search around perhaps with a search light. And conductive anesthesia is very much like that. After you become familiar with it and do it a number of times, you do not have to be intent particularly on your technic. It comes to you just like a woman playing a piano; she knows where the keys are and doesn't have to think about it. I think it is better to think about anything you are doing, especially this kind of an operation; but it is simple after you get onto it, and it is one of the greatest boons. Some one has said that painless extraction was a great advertisement, and it is, because it is one way to relieve them of their suffering, and do it in a painless way, and I believe conductive anesthesia is the only way to do this work painlessly, other than general anesthesia.

Dr. J. L. Austin, Chattanooga: I believe that conductive anesthesia is probably the best thing that has come to us in a good many years. I think probably our patients appreciate an operation without pain more than they appreciate anything else. We often work very hard, we make a piece of bridge work, we insert inlays, fillings, and yet we are surprised at the lack of appreciation the patient seems to have. But your patients will fully appreciate the fact that you do not hurt them. I have used conductive anesthesia for some time, and I do not know of anything else that I am quite so well pleased with. It works very nicely in a good many cases. Unfortunately when we use gas, we fail sometimes to get the right effect. With conductive anesthesia we come nearer than with anything else. It is a good deal easier for our patients and for ourselves, and there are so many places we cannot use gas, and we do not want to use gas. I think every dentist should give some study to conductive anesthesia and go to work.

Dr. H. A. Holder, Gallatin: The essayist certainly ought to be congratulated upon this most excellent paper. It is a question which should command our attention. I know there are some persons, for instance, my good friend Dr. Morgan here, who says that pain is one of the greatest guides that we have in our dental operations. But I want to say that pain is one of the greatest things that is keeping persons from having dental operations performed today.

There are some persons who are neglecting their mouths, allowing their mouths to get into an unsanitary condition, establishing infections there which bring on all sorts of bodily ills, and doing that simply from the dread of the dental chair more than any other cause. Not simply because they do not want to pay for those operations or take the time to have them done, but because they are unwilling to endure the pain which is necessary in order that they may be done. Now this conductive anesthesia comes along as one of the best means of relieving that pain. I think the profession certainly ought to take advantage of this. We can carry this to success like we have carried other things to success. I think we ought to know what we are doing. There are certain cases, such as Dr. Callahan spoke of last night, when we want to know when we get through the end of the root, and we would not want to perform an operation like that under conductive anesthesia, because that is a case where you want to know, and you want to have some sensation there. Now, in the preparation of cavities I have heard persons say: "You are liable to expose pulp if you have the tooth anesthetized; you are liable to expose the pulp of the tooth and place a filling on the exposed pulp and have subsequent trouble." Well, if that is done, in nine cases out of ten it is simply through ignorance on the part of the operator. There is very little excuse for an exposure of pulp in the preparation of a cavity and placing a filling upon that pulp, if that work has been done under conductive anesthesia or any other means of deadening the pain there, because we should all be familiar with the anatomy of the teeth, we should be familiar with the location of the pulp, and if we have to be guided simply by the sensation of pain in the patient, why we certainly do not know as much about the structure upon which we are working as we ought to know. I have been using this conductive anesthesia for a year or two, and I want to bear testimony to the work which it has done for me, and to the work which it has done for a great many of my patients. I think those of you who have not taken it up, should take it up and should study it out.

There is just one question I want to ask, and possibly Dr. Rounds can answer it. It is in regard to just what happens to those tablets when they turn brown, and when the solution turns pink, and just what condition would come about in the patient if that is used? Fischer does not make that very plain. He simply says, discard the solution if it turns at all pink. Can Dr. Rounds enlighten us as to what takes place to make it turn pink?

Dr. Henry W. Morgan, Nashville: I desire to compliment Dr. Rounds on his paper. I have enjoyed it very much, and I agree with Dr. Cattell when he says he thinks it is the last word on that subject. I wish also to invite a very careful reading and study of that paper. I want you to read very carefully what Dr. Cottrell has said. Not until we got down to the discussion of the last two speakers did I hear anything about preparation of cavities. I take it that you knew what they meant when they avoided that subject. I do not want you to go away from here thinking that everybody is now recommending conductive anesthesia for the preparation of cavities. Pulp is put there for danger signals, and don't you cover it up. Don't you destroy its function of talking back at you. I asked a gentleman who just came home from Vienna, after nine years of practice there, "did you make such fillings as these" pointing to some in his mouth, "for your European patients"? He said, "No, sir." "Why?" I asked. "Because they won't stand for the pain of cavity preparations and the long operation it takes to make them." Gentlemen, if American dentistry stands for anything, it stands for thorough, good work. That thorough, good work can only be obtained by painstaking labor and care, and by using every possible function that we can bring to bear upon each particular operation. I tell you if conductive anesthesia is introduced into the operative practice, it is an ax laid at the root of the tree that will be destroying American dentistry, rob it of its fame. Let me beg of you, for God's sake confine it to what Dr. Rounds enumerates in his paper, and let it alone when it comes to an operative procedure or filling operation and filling cavities.

Dr. Holder: Dr. Morgan must have been asleep when Dr. Rounds was enumerating the things for which conductive anesthesia could be used. He included cavity preparation.

Dr. Morgan: I beg your pardon. I did not so understand him.

Dr. F. W. Rounds, Louisville: I will try to answer one question of Dr Holder, in regard to the solution turning a pink color As I tried to bring out in the paper, suprarenin discolors when it is exposed to light, heat or air. If you get a colored or a pink solution, you will undoubtedly get your anesthesia just the same, but derogatory effects are due to the pain afterward, and the swelling in the tissues afterward. There seems to be a slower absorption, with disastrous local effects, due to the fact that the solution after it has been decomposed is not an isotonic solution, which it must be. That is the only explanation I can give. You will get your anesthesia, but the after effects are bad.

Now, I am very glad that Dr. Morgan put forth these objections, because Dr. Morgan is simply voicing the objections which a great many of the profession have voiced relative to this subject, and they are apropos. They are sensible objections, many of them. I presume that Dr. Morgan would advocate the use of conductive anesthesia, we will say, for the extraction of the wisdom teeth. Am I right, Doctor?

Dr. Morgan: Under surgical procedure.

Dr. Rounds: Now, if I anesthetize the inferior dental nerve, and extract a wisdom tooth, I anesthetize as well, all terminals to the point where I have cut off the sensation. The pulps and all soft tissues are anesthetized. I must have an isotonic solution; otherwise, the whole procedure is wrong. We have got to have a solution that is harmonious with the tissues, that is going to absorb gently and gradually, and leave no sore tissues and no after pain. Either our solution is wrong, or our technic is wrong, if we do not get that. Now, if we anesthetize and extract the tooth, we still have the pulps in all these other teeth anesthetized. Are we going to get any more general after-effects from operating on one of those teeth, whether it is an operative procedure or surgical, granted that we are using all our knowledge of tooth construction, and that we are not encroaching upon the pulps? We are certainly not going to get any more trouble because we prepare a cavity of a biscuspid than we would if we extracted a wisdom tooth just posterior to it.

Novocain is not a cure-all. It is not fool-proof, by any means. We should be more careful, and we can be more careful, and make a scientific operation, if we know that our patient is not squirming in the chair, expecting mental and bodily misery. When I conducted general practice, as I did, if I had a gingival cavity of a lower biscupid or molar, and my patient was suffering the torments of the damned, as they most always do when not under an anesthetic I do not know of a case where I prepared a cavity and the patient did not remember me unfavorably afterward. Now I can prepare that same cavity under a novocain injection intelligently, I will not encroach upon the pulp, I will prepare that cavity to the best of my ability, and I can go to work with the patient sitting in the chair, experiencing no pain, and he will go away without a shock or any bad after-effect, and he will not hesitate to see me again. What is wrong with it? I have done the work well. I have not injured the tooth structure, and granted that I have an isotonic solution, I have not injured the tissues and I have not injured the patient's general constitutional condition in any way.

This is vital. If we are wrong, we ought to know it now, when conductive anesthesia is in its infancy, and if we are right, we ought to know it so we can do better work than before. Dr. Morgan says it is new. So it is. We have used it in our office for nearly four years. In the last two years we have used it almost exclusively for the removal of pulps and the preparation of cavities where pain was involved to any appreciable extent. We have watched many of those cases with radiographs for the last two years. I have not seen a case yet, where the technic was right, where there was any disastrous result to the pulp of those teeth. The time is short, I will grant. It may take five years. But my point is this: If I do encroach upon the pulp, I am going to have a disastrous effect under anesthesia or not, but if I do not, and my technic is good, I fail to see where conductive anesthesia has any bearing upon future pulp vitality.

PULPS, PULP CANALS, AND THEIR RATIONAL PRESERVATION*

BY ALBERT F. LINSCOTT, D.D.S., MARION, OHIO
PRESIDENT OF THE OHIO BOARD OF DENTAL EXAMINERS

THE DENTAL PROFESSION in every country where dentistry is practiced is being confronted by the Decay of Man, which is being exemplified clearly through the deterioration of the teeth. Dental caries is found in practically every mouth examined, underlying which may be found varied conditions of pulp affections.

The rank and file of the profession attend dental meetings and listen to treatise on this vast subject, and return to their homes with discouragement lurking about them. Their years of practice, which to them had been very satisfactory, their treatment of tooth affections no longer considered right, must now be discarded for something new. The next meeting or magazine may shatter the "new friend," and before long one is afraid to look at a pulpless tooth without feeling that extraction is the only safe conclusion.

The object of this article is to encourage the average man in dentistry to take new courage, discard the thousand-and-one things which are being brought on the market for someone's gain, and select from a rational standpoint the thing which will give service, study the effects it will have when applied to the affected part, and when he finds he has a sound footing, stand pat on that footing.

It is not the object of this paper to have the reader leave a tried and true treatment in his office to try this one, but to show how the writer has had no discouragements in many years of successful root filling. If, after years, cases which were of the most aggravating kind, come back and the roots are opened and found to be in an aseptic condition, it is safe to say you have had a successful root filling.

It has well been said that if you have made failures in the past, there is no reason why you should keep on failing. Study your case, be alert to the conditions, and there should be no reason for failures.

In taking up the discussion of this subject, it is with the understanding that there are many ways of handling the treatment of pulp canals where putrescence may be found, and there has never, so far as the writer knows, been produced any specific which can reach every case and be termed a "cure-all." I also take up this subject with the understanding that those who hear it discussed may agree with the writer wholly or in part, or reject the system entire. The method hereinafter to be mentioned is the general course taken by the writer in the cases as presented for treatment.

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*Read before the Mad River Valley (Ohio) Dental Society, 1917.

Before going into the subject of treatment, we should know what we are treating, and the histological construction of the human tooth in order to better understand the physiological effects of the treatment after it has been applied.

In order that the reader may gather a clear idea of the subject at hand, the writer feels that a few words in regard to the teeth and their development will here be in place.

The teeth, which are hardened papillæ, are firmly retained within their respective sockets by the close attachment afforded by the alveolar periosteum which holds together the alveolus and the root of the tooth. The periosteum lining the alveolus is composed of dense fibrous tissue, whose fibers have a general transverse disposition; elastic tissue is almost wanting, nerves and blood vessels being numerous. At the neck, the tooth is especially embraced by the thickened periosteum, which then becomes continuous with the periosteum covering the alveolar process of the jaw and with the gum.

The tooth comprises the dentin, the enamel and the cementum. "The dentin or ivory principally contributes the bulk of the tooth and also gives the characteristic form of the tooth, enclosing a central pulp cavity, except where the narrow nutrient canal, admitting the blood vessels and nerves to the pulp, pierces the apex of the fang. The dentin is composed of a matrix or ground-substance, which must be regarded as a modified connective tissue, formed of bundles of fibrous tissue, intimately united and subsequently impregnated with calcareous salts.

"Piercing the ground-substance and appearing under low amplification as a radial striation, the dentinal tubules extend the entire thickness in the dentin as minute channels; they are seen especially well in sections of the dried tooth in which the channels or canals are filled with air. Starting from the pulp surface the dentinal tubules pass in a slightly wavy and spiral course through the dentin to terminate in irregular clefts, the interglobular spaces, situated at the juncture of the dentin with the enamel or the cementum.

"The tubules give off numerous secondary canals along their course, by which means the adjacent tubules communicate; on approaching the enamel or the cement the tubules undergo repeated division, the resulting smaller secondary channels corresponding in their general direction with the large canals.

"Marked parallel curves described by the dentinal tubules produce optical effects which are appreciated as a course striation concentric with the line of the pulp cavity; these appearances, known as Schrager's lines, may be seen in sections with the unaided eye. That part of the dentinal matrix immediately surrounding the tubules is especially dense and resistant, and constitutes the so-called dental sheaths which may be isolated by acids. Within the tubules lie the delicate dentinal fibers, which are modified processes of the connective-tissue cells forming the peripheral layer of pulp cells. When cut across the tubules appear circular or slightly oval, and contain a minute dot, the dental fiber in transverse section. Want of uniformity in the calcification of the outer zone of dentin gives rise to the incremental lines of Salter.

"The interglobular spaces are irregular, stellate, intercommunicating clefts situated at the margin of the dentin, into which open on the one hand a number of dentinal tubules and on the other hand the spaces or lacunæ of the cementum. Each space contains a protoplasmic body, the connective-tissue cell, the processes of which unite with the dentinal fibers.

"The enamel covers the exposed parts of the softer underlying dentin and is composed of irregular four-six-sided columns, the enamel prisms, closely placed and generally vertical to the surface of the dentin.

"After suitable isolation the enamel prisms appear slightly varicose in outline, the minute concavities producing the irregular dark bands often seen transversing the prisms. The prisms are held together by a delicate layer of cement-substance, and grouped into bundles which cross one another, producing the alternate dark and light radial bands seen in the enamel. The additional dark lines extending more or less parallel to the free surfaces of the tooth—the stripes of Retzius—are probably due to the unequalities in growth and density. At birth and for a veritable time thereafter the outer surface of the enamel is covered by a delicate but resistant cuticle, the membrane of Nasmyth, composed of keratose epithelial plates, the remains of the enamel organ. Next to the dentin, numerous clefts exist for a short distance between the enamel prisms; they communicate with the interglobular spaces and thus indirectly with the dentinal tubules.

"The cementum or crusta petrosa, invests the fang of the tooth and closely resembles in structure ordinary bone; the lamellæ extend parallel to the dentin, as do likewise the long axis of the bone lacunæ. Where the cementum reaches a considerable thickness, as at the apex of the root of the tooth, Haversian canals may exist, although usually these are wanting, the outer layer of cement contains fewer and smaller lacunæ. The lacunæ communicate with the dentinal tubules, while the protoplasmic processes of their contained bone-cells may come in contact with the filaments of the odontoblasts lying within the dentinal tubules.

"The pulp consists of a matrix of soft embryonal connective tissue, in which numerous stellate and spindle cells form protoplasmic network by their anastomosing processes. At the periphery the connective tissue elements are arranged in layers of elongated cylindrical cells perpendicular to the inner surface of the dentin, in contact with which they lie; these cells are the odontoblasts, being the representative of the cells which were actively engaged in producing the dentinal matrix. The protoplasm of many of these cells is prolonged peripherally as delicate threads into the dentinal tubules, the processes becoming modified to form stiff elastic dentinal fibers; centrally, the odontoblasts frequently are connected with the stellate connective-tissue.

"The pulp is richly supplied with blood vessels and nerves. The arteries run in a long axis of the tooth, breaking up into capillary network which are closest to the periphery. The nerves accompany the larger blood vessels as medulated fibers; these give off filaments which pass to the layers of odontoblasts, among which they extend as pale fibers. The ultimate distribution of these latter is still unsettled; the assertion that fine fibrillæ accompany the dentinal fibers into the tubules lacks confirmation. While there are clefts within the matrix between the connective-tissue fibers representing lymphatics it has not been distinctly proven that there are lymphatic vessels within the pulp, although these spaces are in close relation with the adjacent lymphatic channels."

From the foregoing histological description of the tooth and the pulp of the tooth, the reader may at all times carry in his mind the full construction of the organ to be treated. The operator should carry at all times in his mind the picture of a tooth "chassis," and reason out a rational treatment. Think, first of all, what you are treating; is it the root canal you should first take into consideration, or is it the wound at the end of the root, or is it an inflated sack at the apex of the root, surrounding and embracing the cementum of the tooth, or is it some other pathological condition which should be taken into consideration?

The beginner in the treatment of the diseases of the dental organs, will have great ideas for the needs of his patients, and will have a number of agents which he will apply to cases, and if the one will not do the work in a few days, he will try another and maybe the third, and finally his case yields to something and he feels that he has been a success. If you should inquire what treatment cured the case you cannot hope for a definite answer. Any of the three or half-dozen tried might have done the work, had the operator thoroughly understood the case, but having used so many dopes there could be no special credit given to any one of them.

No man treating teeth can tell, under three years of work, what has been the most successful remedy in his hands. The records of the same remedy, in the hands of other operators, will not tally unless the technic be fully mastered. The minute details may have never been mentioned by instructors, who knew the system so well that it was considered that the student should have read between the lines, or else have known certain points by intuition. The student of dentistry, as a student, knows so little that he should know, and goes out to carve up an unsuspecting public, that his intuitive powers are so weak that little if anything will manifest itself.

Realizing that the only thing handed the student, aside from his diploma, is a foundation upon which to build his future, unless he shows some special interest in the affairs of his profession, no great structure will ever be placed thereon.

The writer felt when he returned from school that there was little left for him to learn in treating the various cases which presented themselves.

By and by, as time went on, his eyes were opened to the fact that there were many things to be learned of which he had never heard. These revelations were the turning point in the career of the writer, and will be the turning point in the career of every young man launching his raft on the sea of professional business and beginning to operate for an unappreciative public.

The writer had a long list of "dopes" which were prepared from the drugs to be found in every dental medicine cabinet, as oil of cloves, eucalyptol, iodoform, oil of cassia, Black's 1-2-3, and a hundred-and-one other things. I figured there must be some treatment which would give definite results in the treatment of putrescent pulps and abscessed conditions of the teeth.

Knowing the antiseptic and germicidal properties of formaldehyd, it was worked up in various mixes with other antiseptics and used for treatments with some uncertain conditions arising. With continued efforts I finally have a formula which I have found most valuable in the treatment of putrescent pulps, fistulas, etc., and also as an antiseptic preparation in the filling of root canals.

The preparation in use is zinc oxid, thymol, alum, beechwood creosote, formaldehyd and alcohol. This preparation has been used by the writer for more than a dozen years, together with some judgment in its use, and success has crowned my efforts.

Zinc oxid is obtained from zinc carbonate at red heat, is an antispasmodic and astringent, and gradually absorbs carbon dioxid. *Thymol* is a phenol of the benzol series. It appears in colorless crystals having an aromatic, pungent and slightly caustic taste and is nearly neutral in reaction. It is not as caustic as phenol but more destructive to putrefactive substances. *Alum* is useful as an astringent, in drying wounded surfaces. *Formaldehyd* is an oxidation product of methyl alcohol. Water will take up and retain about forty per cent. at ordinary temperature. It is a powerful germicide, yet is not very dangerous to the higher animals. Its volatility makes it very valuable in the treatment of wounds at the end of the root. *Creosote* is a mixture of phenols, chiefly guaiacol and cresol, obtained from beechwood tar. It is very poisonous to micro-organisms, which makes it a valuable adjunct to the above formula. Always be sure to specify *beechwood*, as the coal tar cresote will never do.

While there are about sixty-nine elements known to chemistry, only six are concerning us in the study of the decomposition of the pulp of the tooth. These are: C., H., O., N., S. and Fe. The various substances found in animal tissue are divided into nitrogenous and non-nitrogenous substances.

The nitrogenous substances are the proteids or albuminous substances, which are the essential part in the formation of living tissue. These elements which constitute a proteid molecule are carbon, hydrogen, nitrogen and sulphur. Carbon as it exists in nature has three forms: charcoal, graphite and diamond, none of which can be fused or volatilized. Hydrogen, oxygen and nitrogen are colorless gases which cannot be solidified by any known means and can be liquified only with the greatest difficulty. Chemically we know hydrogen to be volatile, combustible—oxygen to aid combustion, but will not burn, while nitrogen is perfectly indifferent.

The non-nitrogenous substances consist of the carbohydrates and fats. The carbohydrate molecule is composed of carbon, hydrogen and oxygen.

We are thus led to believe that the pulp tissue like all other organic tissue, is composed of proteids, carbohydrates and fats.

"The decomposition of the pulp takes place gradually. All conditions being favorable, the germs first act upon the complex and unstable substances, composing the original tissue, splitting them up into less complex compounds, many of which are capable of further analysis; and the process goes on until simple and well-known compounds are formed. For convenience in studying this subject the compounds resulting from the analytic process will arbitrarily divide into two classes, intermediate and end products; and it will be seen that it is largely the products of putrefaction rather than of fermentation with which we have to contend in the correction of the putrescent condition." (*Buckley.*)

"The intermediate products depend to some extent upon the micro-organisms found in the pulp tissue, but it is safe to say that certain ptomains and amido-acids are found."

Ptomains are decomposed animal alkaloids, while the amido-acids are acids in which hydrogen has been replaced by the univalent radical NH_2.

The chief end-products of pulp decomposition has for a long time been known to be water, carbon dioxid, acetic acid, ammonia, hydrogen sulphid and other substances consisting princiaplly of fats, this, however, depending greatly upon the progress of the putrefactive process.

The principal gases formed by the putrefaction of the dental pulp are ammonia and hydrogen sulphid. To ascertain the amounts of these gases formed we must recall that the relative amount of nitrogen and sulphur found in a molecule of proteid matter. As has been previously stated, there is a greater amount of hydrogen to be found in a molecule of proteid matter than sulphur; thus ammonia gas will be evolved in a greater quantity.

Knowing the construction of the pulp tissue and the substances found after decomposition, we are now ready to proceed with the treatment of the pulp canal and the irritated conditions to be found, caused from such decomposition.

The patient presenting with a putrescent pulp or an abscess, the following course is followed: The tooth is well opened with a bur, and the decayed pulp and the pus removed. When the canal has been opened and the tooth enamel chiseled back to give free working space for the operator, the root is washed with hot water carried on a broach, which dislodges all decomposed tissue of the pulp. The patient is directed to draw on the cavity in order to dislodge any portion of decomposed matter which might remain in the extreme apex of the tooth. The canal is dehydrated by means of ninety-five per cent. alcohol, after which it is ready to receive the first application of the treatment. In a tooth of this kind the writer can see no logical reason why peroxid should not be used as a cleanser, and in many cases believes it would be very advantageous.

The toilet of the tooth being completed, the before-mentioned formula is applied to the root canal and the tooth filled with a gutta-percha filling for the period of three days, at which time the filling should be removed and the canal cleared completely of the first application of the treatment. At this time the operator will see a serous fluid in the cavity, which should be removed by the aid of cotton on a broach or cotton point. The second treatment may now be applied and left for ten days or two weeks, after which ninety-nine per cent. of the cases will be ready for the filling or crown as indicated.

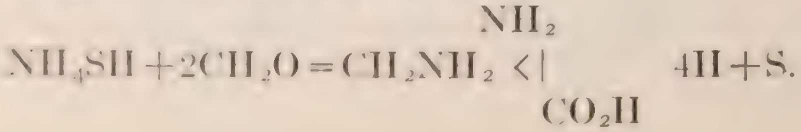
In order that the writer might be sure, or feel a certainty that the tubuli along the canals were filled and that no shadows be reflected, a fine grade of sandarac varnish was used, but of late the cavities have been wiped out with Fletcher's copal-ether varnish and dried by means of a hot-air blast. The canal being thus treated it is half filled with the formalin paste, mixed rather stiff, and by passing a gutta-percha point through the center of the mass it will about fill the canal. The balance of the canal may be filled with cement or any of the plastic filling materials, after which the tooth may be completed.

If the canal is winding and tortuous and difficult to enter, or one that an uncertainty prevails as to whether the pulp has been removed entirely, the formalin preparation will take care of it and you need not stay awake nights worrying.

It should be interesting to know how the preparation works in the cavity, or the chemical action produced, where there is or has been a putrescent pulp. As was stated before there are found two prinicpal gases present in the canal, due to the decomposition of the dental pulp—ammonia gas and hydrogen sulphid gas. These gases will not mix in their present condition, but by adding water the ammonia gas is formed into ammonium hydroxid which is readily attacked by the hydrogen sulphid, and forms ammonium-hydrosulphid and gives up its atom of water. When the treatment is placed in the tooth the heat of the body causes the formaldehyd gas to be generated, which unites with the ammonium-hydrosulphid and forms amido-acetic acid, liberating the hydrogen, set free by the univalent radical NH_2, and one atom of sulphur will remain which is inactive. The acetic acid is readily taken up by the blood and eliminated, for as a general rule it does not reduce the alkalinity of the blood or render the urine more acid, because they are oxidized to carbonates by the tissues.

$$NH_3 + H_2O = NH_4OH \dot{-}.$$

$$NH_4OH + H_2S = NH_4SH + H_2O.$$



$$NH_4SH + 2CH_2O = CH_2NH_2 < \begin{matrix} NH_2 \\ | \\ CO_2H \end{matrix} \quad 4H + S.$$

Should the tooth be accompanied by a fistula, the same procedure should be followed as before mentioned, except that the fistula should be washed with warm water, peroxid, and then followed up with a two to three per cent. solution of chinosol. By applying the formalin paste the fistula should be healed entire in four days, unless it is a case of long standing; then extraction is the only advisable plan.

Where pressure anesthesia has been used, or in cases of children where the roots of the teeth are not fully developed, the formalin preparation should be used sparingly. After the pulp has been removed by pressure there is always more or less hemorrhage which must be taken into consideration. The blood must be removed and the root thoroughly cleansed from blood stains which might be present, and the canal flooded with adrenalin for the prevention of recurring hemorrhage while the operation of filling is in progress. The root being clean, is either varnished or not, and carbol eugenol is mixed into a stiff paste and the root filled. This has the chemical action of hydronapthol, non-irritating, germicidal and non-poisonous, and more effective than phenol. It remains active and makes a good root filling and restores normal conditions and keeps healthy tissue in a healthy state.

The above paper is based on rational thinking and study of the pulp and on the reactions which have been actually practiced enough years to make the method of saving teeth a success in the hands of the writer. A trial of the method will do no harm to any progressive practitioner, and one trial will call for more and varied cases in which this most valuable asset to the man who is at the end of his string to know what next to do. Repeating what was said in the outset, that this theory and practice may be accepted or rejected, in part or in whole, still stands, but don't lose sight of the fact that in this method you have a friend.

If I can let into some soul a little light,
If I some pathway dark and drear can render bright;
If I to one in gloom can show the sunny side,
Though no reward I win—I shall be satisfied.

Removing Blood Stains

The *Druggists' Circular* advises the use of a concentrated solution of chloral hydrate, from 70 to 80 per cent., for the removal of blood stains. Not only recent blood stains on linen, etc., but stains existing for from ten to twenty years, first moistened with a drop of acetic acid and then soaked for some hours in the chloral solution are said to be perfectly removed. Blood stains on white material may also be removed by treatment with hydrogen peroxide solution. It may take some hours to act if the stain is old.

A FEW WORDS FROM THE PREPAREDNESS LEAGUE OF AMERICAN DENTISTS

BY J. W. BEACH, CHAIRMAN

The Preparedness League is now a factor to be reckoned with in the future conduct of the dental profession. It would be difficult to give our members a correct understanding of the different activities or the magnitude of the work of the League. We would like, also, to express our appreciation of the support accorded our organization and especially recognize the great work being done in Ohio.* The whole state is practically formed into one great study club, under the leadership of Dr. Frank Casto, president of the Ohio State Dental Society, assisted by a corps of enthusiastic workers. The good accomplished toward the general uplift of our profession cannot be estimated, and the apparent effect will be the unification and harmonious interchange of every project undertaken by us as dentists.

The great difficulty we are experiencing is to give our members all the information we would like them to have and that which they are anxious to receive. However, we hope to overcome this handicap very soon. A meeting is to be held in Pittsburgh on April 21st, when a broader organization comprising an executive committee of twenty-five dentists, among whom the various activities of the League may be distributed and be prosecuted more systematically. We would direct our members to our present predicament relative to the demands made upon us. We are obliged to carry on a full practice of dentistry, taxing enough in itself, while endeavoring to personally answer from twenty-five to fifty letters each day, write articles for dental journals, act on various committees and do an infinite number of other things relative to this great work.

On Sunday, April 15th, the Committee on Dentistry, Council of National Defense, met in Washington and laid plans for the immediate mobilization of all the resources of the dental profession which may be made use of by our government in time of war. As a member of that committee and a representative of the League, the specific mission of organizing the profession in the most rapid and efficient way, to take care of all worthy applicants for enlistment who are unable to pay for the necessary dental service, is given over to the League officially. Through the machinery of the League already set in motion, we estimate that approximately 500 are being cared for daily throughout the country. We earnestly request the Chairman of Units, officers of societies and individuals to report to us all such cases.

As soon as possible we will arrange to keep our members properly informed through the journals, as it is our desire to enlist the fullest co-operation.

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*Under the organized effort of Dr. Casto, President Ohio State Dental Society, and his appointed co-workers, the whole dental profession throughout Ohio was virtually organized into units for base hospitals within a period of two weeks.—Editor.

SOME MECHANISMS UNDERLYING ORAL INFECTIONS AND THEIR CONSEQUENT LOCALIZED AND GENERAL LESIONS*

BY WESTON A. PRICE, D.D.S., M.S., CLEVELAND, OHIO
DIRECTOR OF THE RESEARCH INSTITUTE OF THE NATIONAL DENTAL ASSOCIATION

I COULD NOT SPEAK this evening without expressing my very great appreciation of the splendid and unanimous support that has come from the profession in this state, not only to me personally, but to this work with which I have been associated for the National Dental Association, and I bespeak for the National Dental Association a very much larger future and usefulness than would have been possible for it had it not been for the spirit of Iowa, and I take this opportunity to express my great appreciation for the invitation to come the third time to your state. It speaks louder than any words that you could use in assuring me of your sympathy and co-operation with the work.

We will speak this evening of the work of the Research Institute first, and then of some special studies that we have been making, and in regard to the work of the Research Institute I want to say briefly that the researches are being conducted in eight different cities: in Minneapolis under the direction of Dr. Hartzell, assisted by Drs. Henrici, Grey and McCarthy; in Colorado Springs under the direction of Dr. McKay; at Chicago under the direction of Dr. Noyes; in Ann Arbor under the direction of each Dr. Ward and Dr. Bunting; in Boston under the direction of Dr. Percy Howe; in New York City under the direction of Dr. Gies; in Cincinnati under the direction of Dr. Callahan, and in Cleveland under the direction of Dr. Fahrenwald and myself, Dr. Fahrenwald being a trained metallurgical expert. In connection with this work I wish to state that several very important discoveries from a metallurgical standpoint have been developed and those processes are being protected for the dental profession by patents, which patents are being assigned for the free use of humanity.

I shall not have time to study with you at any length the splendid work which these men are doing. When we mention the work of Dr. Hartzell we are speaking the latest word on oral infection as related to systemic disease, for no man—I shall not except any—has done or is doing as important work in working out the details of mouth infections as they relate to systemic disease as the magnificent work of Dr. Hartzell and his splendid corps of workers, and I have very great pleasure in doing what little I can to raise money to support such work as they are doing. When I tell you though that a man like Dr. Henrici is devoting all of his time to research work and must have support, you will understand why a man of his competency, doing nothing to earn money, must have a salary competent and commensurate with his ability and that salary must be forthcoming from month to month, and we must know more than a month ahead, and more than a few months ahead, whether we can pay such salaries. Therefore, the research department of the National Dental Association, which is the Research Institute, is working out a plan whereby we shall have ample support for all the research work, and we shall probably have an opportunity to speak of that at another time. But the plan, in brief, is to have an endowment of one million dollars, the interest on which would be practically fifty thousand dollars a year at five per cent., and that interest will maintain and enlarge our present researches and carry them on in a way that would be commensurate with the problems that are at hand. And, more than that, it is hoped and expected that the dental profession of the country will take practically one-third of that million dollar endowment in this simple way, viz.: by paying one dollar additional dues each year, which dollar will pay the interest on twenty dollars of principal. If, then, the 18,000 members in the National Dental Association each pay one dollar annually, we will have the interest on twenty times $18,000, or $360,000.00, which would, you see, be more than a third of the million. And I have an idea that every state in the Union will take that matter up unanimously and put it into effect within twelve months. Practically every state that has taken it up has done so unanimously, and at their first opportunity after the plan was suggested. There are important difficulties with the present plan of a few men each paying a large subscription for a period of years. It is not fair in the first place that a few men should pay for the privileges and benefits that come to the large majority. Accordingly all are put on an equal basis by each man paying one dollar a year to support the research work. That plan is to supersede the individual pledge plan and we will then have every person feeling that he has an equal part with everybody else.

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*Stenographic report of a lecture delivered before the Iowa State Dental Society, 1916.

The metallurgical department is furnishing substitutes for platinum in sufficiently large quantities to amount to a saving of many thousands of dollars to the dental profession. I should think it would amount to nearly twenty thousand dollars that has been saved to the dentists of the United States already by the tungsten that they have purchased through the research department at cost. It is used for orthodontic appliances and reinforcement over which to cast bridges, and for crowns, posts, etc. The sum saved would go a long way toward paying for all the researches that have been made. You are all familiar with the effort to make this an everybody's movement, a National Dental Association work, and when I tell you that the medical profession and the laity are, if possible, just as much interested in this movement as the members of the dental profession, you will realize the great responsibility that is upon the dental profession, for they are asking us many questions that cannot, as yet, be answered.

We are to discuss this evening some of the mechanisms of infection. This problem is infinitely too large, too difficult, for me to discuss comprehensively. I shall bring out only a few of the mechanisms and as we do so I want you to think of the relation of the organisms to the human element, the human body, a great deal as you think of other mechanistic problems; and to get your thought in that respect I am going to ask you to think with me for a moment of the little caterpillars that trouble the orchards. This little organism, as you have observed, goes to the end of the twig; it never goes down to the ground; the ground is cold and damp and clammy, and it would die there; there is nothing green there for it to eat and it never goes down, it always goes up to the end of the branch—God's wonderful instinct we call it. Yes, but now we can see the foot-prints of God; we can understand how God makes that little insect go to the end of the twig, for God has put into the eye of that little animal a motor control just similar to the patent recently purchased by the government which controls the little boat that goes out with a load of dynamite, a torpedo, controlled by a wireless apparatus; and just so God has put into the eye of that insect a mechanism that, when the light strikes it, it cannot travel against or away from the light, so, since the light is above it must go to the end of the twig. And the involved physical chemistry is now pretty well understood, for when that little organism goes to the end of the twig and finds there the green succulent leaf, it takes in a new chemical from that leaf which acts on its body and on its eye in such a way that after it has once filled its little stomach with food from the green leaf, the chemistry of the eye is changed and it is freed from that mechanistic control; it is no longer light-controlled, heliotropic, and can now turn around and go down. If you take those little insects and put them in a little box right beside some green leaves and put a bright light just on the other side, and even though there is an abundance of food all around and behind them, they cannot turn around to take that food, and will starve. Why? Because of the mechanistic, physico-chemical control. In other words, we just see for a moment God's method.

Tomorrow evening when we are studying developmental deformities and the entire process, and will see the elements coming together to make the component and ultimate life, you will see they are controlled by chemical reactions which take place so quickly that you cannot see them, and you will also see organisms that move under the mechanistic control, for example, the paramecia with the electric current. They are so perfectly under the control of the electrical current that they go in only one direction, and when you reverse the current they can go only the opposite way. What is it? A mechanistic control. And these little organisms that we are studying this evening do very many of these same things. If you take endameba, it has just as definite mechanistic problems. The very process of its throwing out its pseudopodia is one largely of the relation of surface tension at that point and the rhythmic motion, as you will see in the motion pictures, by which it throws them out in concentric waves is almost entirely a mechanistic problem.

Now as we undertake to get into an attitude of mind to see these things mechanistically, let us also think of how much alike the organisms that are in our mouths are like ourselves. You can hardly tell the organisms that you will see tonight on the screen from some of the first-stage cells of embryonic life; they will be identically like many embryonic life forms that we will see tomorrow night; they are one-celled organisms; there was a time when you and I were each a one-celled organism; then we changed to two cells, then to four, then to eight, etc. These we study tonight are practically all one cell, just as we were once, and they behave just as we did—they eat just as we must do. Every living cell, whether a bacterium or a cell of my body from the lung, the liver, kidney, or my hand, behaves just like every other cell. It must do three things, viz.: it must eat, it must assimilate and it must eliminate. Now let us get this definitely in mind, that every living cell, whether a plain human tissue cell, whether a bacterial cell or any animal or plant tissue cell, does these same three things. There are, however, certain resting stages in all these different forms of life. A grain of corn is a resting stage. A human ovum is a resting stage. The spores of bacteria are resting stages. They are all identical. A resting stage only differs from the active in that it contains potential life instead of active life. The potential life that is stored up is expressed in the grain of corn as so much enzyme, so much food, and a fertilized germ cell. This germ of life has been fertilized, for in the corn we have the male and the female elements, nourished and fed by the digestive enzyme acting on the starch just as you have been nourished by your stomach digesting that good dinner you had tonight. Each and every living thing has a digestive fluid so that when we study these bacteria tonight we will find that they are living by means of their digestive fluid just as you and I do. The chief difference between one kind of cell life and another, whether human or animal tissue, is the difference in the protein that makes up the cell. And similar cells have similar proteins, but the vital part of all cell life is that protein.

I want you to keep another important fact in mind. Life's activity is metabolism and has to do with vital processes. You cannot have continual life without activity. It is impossible for the resting stage, such as these germ cells that we are speaking of are capable of assuming, to continue for a very great length of time, and these spores that we shall study exist as such in the mouth for not a very great length of time. But these different forms of cell life which have different protein within themselves will live on a common protein from which they make their particular protein.

Now, when you take a splendid piece of roast beef like I had tonight, and you make it over into your various cell proteins, what takes place? Your body furnishes first an enzyme or digestive fluid to split up the protein you take into your body and makes it over into a protein suitable for your individual cells—a different protein for every different tissue of the body.

The difference between the dinners that you and I ate tonight would depend upon our taste, and our taste is determined largely by the digestive enzyme that we have, or digestive ferment with which we do the digesting. Now, let us suppose that you take into your body a quantity of beef-steak. How does it get to the cell of your hand? First, those large molecules that make up the protein of the beef-steak are split up into smaller elements and are passed through the walls of the alimentary canal, and get into the circulation and pass into the blood stream and from the blood stream are delivered to the different tissues of the body. Now, the different tissues of the body in turn have different digestive fluids and they will take the particular split protein that comes to them, will make it over to suit their own cell life, and they will make it fit exactly the type of protein that is needed for their cell structure. Now supposing some of the protein would go through the stomach wall directly into the circulation; what would happen? It is so foreign and coarse, so to speak, that it cannot be digested.

Take another illustration: Suppose you had a soft boiled or a raw egg and you take it into your stomach. It is digested and thereby split up and then the protein in a split form is put into your circulation. Now supposing you put some of that egg into your circulation without breaking it up in your stomach. What would happen? Why, it would be as indigestible there as so much foreign substance—just like chips floating on a stream of water; it would not be acted on at all at first. If you were to take even one-millionth part of an ounce of an egg and put it into your blood stream tonight and then next week put in a greater quantity, it would kill you. Now why? Note when you put it in first it would not hurt you a bit; but when you put it in the second time it will probably kill you. What happens? When that first protein goes into your blood stream, immediately nature realizes the presence of a foreign protein and undertakes to build up a chemistry that will destroy it. There is no chemistry normally in your blood stream to destroy the egg albumen, but presently one will be built up and in probably twelve to fourteen days there will be so perfect a chemistry built up that if you put any more of that protein, or most any protein whatever, into your blood stream on two different occasions, when it goes in the second time your blood stream is ready with a chemistry that will split it up so readily that it will probably kill you. Now, how does it kill you? Some of you cannot eat eggs; some of you cannot drink milk; some of you cannot eat bananas. When I was a student in college and bananas were cheap, I overate on bananas, that being a cheap food, and I was trying to live very cheaply. What did I do? Probably every person in this room has done it with some particular kind of food. You have eaten enough of that one food so that some of it goes through the alimentary wall and it has thereby gotten into the blood stream in sufficient quantity that ever after that, because a chemistry was built up to tear that protein apart, whenever you would eat too much of that protein it would go through your stomach wall and the least little bit getting into the blood stream circulation would be sufficient to bring on certain definite symptoms. That is the process when a person is not able to eat a certain kind of food, and it is identically the same process which takes place when you get an immunal disease.

Let us suppose that you have had typhoid fever, and now you do not get it again. Why? When you first got typhoid fever, an organism got into the blood stream; you were not sick at all; the organisms themselves did not kill you, the organisms themselves did not hurt you—they did not even make you ill. What they did was to produce a certain definite specific protein by taking your blood proteins and building a toxic protein out of them, which in turn floated through your system just like the egg albumen. You said you never felt better, until suddenly your blood had perfected a chemistry whereby it could take that foreign protein and split it up. Now here is the tragedy: One-half or one part of every protein is a rank poison, just as common table salt is made up of two poisons, sodium and chlorine; you could not take either one into your system and yet they both do not hurt you. Every protein is made up of a poisonous part. That action, then, of the blood in splitting up the protein that gets into your blood, which we know as an enzyme action, is the very thing that makes you sick and you were not sick until the blood liberated the toxic poison from the protein. History shows that the stronger the man is the more likely he is to die with pneumonia or typhoid. Why? Because the more of that protein that he can tear apart in a given length of time the more poison he thereby liberates in his system and it is the presence of that overwhelming amount of liberated poison that kills the man. That is why the great epidemics in the past have not taken the poorest of the population but have taken the best of the population. The fact that they can rapidly tear down the bacterial specific protein is the very thing that is their undoing. The man who has so weak a constitution that he cannot tear the protein apart rapidly gets over the disease.

Now then, coming back, let us suppose that you have an infection, say a typhoid infection; you have taken the germs into your stomach, they have gotten into your circulation and all through the body and generate or create a new specific protein which of itself is not a poison to you, but finally your body builds up a chemistry for that or any other foreign protein that gets into the blood, and when it does and splits it up in sufficiently rapid quantity then immediately you feel sick and develop a fever. The fever that accompanies it can be produced precisely the same without any bacteria whatever by simply taking the proteins themselves and injecting them into the body.

Now, what has that got to do with mouth infection? Why, it is the basic principle of the whole process. It is why you and I are alive tonight. Almost every one of us would have enough bacterial infection in his mouth to kill him if it were not for the fact that each body has built up a chemistry that destroys the protein as fast as it comes into our blood. But finally some people get so sensitized to it that a very small quantity is sufficient to seriously injure them. I know of a case where a man was suffering from protein poison from eating apples and they suspected that was the cause; so they took some of the apple and rubbed it on his skin, first extracting the protein, and from Tuesday until Thursday they thought he would not live. He was so extremely sensitive to that small amount of apple protein that they found that one seven-millionth of a gram of the protein of that apple was sufficient to bring on a profound reaction in him. That seems strange to you, but yet you drive through the fields and come in contact with the pollen from the plants and it does not take one seven-millionth part of a gram of the pollen to make you ill. Some people cannot ride behind a horse, and others cannot smell certain flowers. There are a good many things that irritate different people's bodies. Some people cannot be in the presence of rag weed in pollen season without causing hay fever. It is the same process. They are sensitized to an infinitely small amount of the pollen.

Just so, then, our mouth infection problem is related directly to our sensitization and a great many people are so sensitized that they are just on edge all the time; they are in the balance and the balance swings one way and then the other and if you get to studying this protein poisoning problem you will see that they sway as a pendulum does. For a period they are perhaps having an intense headache, a great deal of lassitude, and perhaps the next week they will say: "I never felt better in my life." What has happened? Why, just by the presence of that protein, Nature has been stimulated to build up its chemistry a little more actively, and immediately that it has done so they are able to destroy and neutralize that poison, and for two or three weeks or maybe longer they are a great deal better, until finally they sag back to the same position, and so you see them oscillate.

You may have the process in your own life. That is the reaction and the whole process of using a vaccine. If we are going to be successful with it we will put in the right amount to stimulate nature to build up the proper chemistry.

We will now take the slides and study some of the different infective processes, and as we go along, if we have time, we will try to discuss some of them from a mechanistic standpoint, and for the final pictures we will have a motion picture of the organisms of the mouth and of the blood stream, showing the normal blood stream with the blood cells seen driving through very plainly, and then bacteria will be introduced into the blood stream and you will see the process of agglutination and embolic clot formation. It is an interesting thing that when you take a rabbit and inject the anthrax germs there is something about the rabbit's blood that destroys entirely that organism, but they grow readily in a guinea pig's blood. There are, then, in our blood, certain elements that are provided or developed by nature for destroying organisms and, if we have time to go into the mechanistics of resistance of the different tissues of the body, we will emphasize them, and the process of resistance or immunity to disease is entirely measured by the activity of this reaction. Why is it that the organisms in my mouth do not enter my system? It depends on three things, chiefly, as pertaining to the organism. That organism must have virulence we say. What is virulence? It is the ability to produce disease, but that is not related always to my susceptibility; it must have another thing, it must have the ability to break down the resistance of my body and it must have numbers. And there will be another side to the battle, the elements of which will vary, namely, the protecting skin of my body, the resisting agents in the blood and the traveling army of leucocytes and phagocyting cells.

So think of every cell, whether a bacterial cell of a human tissue cell, as having these three elements: It must be in the presence of food; it must digest that food and it must eliminate it. Now supposing that a bacterial cell was affixed to a living cell in my mouth; both are at the same game, both have largely the same weapons of attack and defense. Just as the bacterium is trying to throw out a poison to paralyze the tissue cell and is trying to digest the tissue cell, just so the tissue cell is throwing out a fluid to digest the bacterial cell and each one is at the same time building up a chemical that will paralyze the other as well as digest it or neutralize its injurious effects. Now, the body has these wandering cells or white blood cells—we will see them wandering through the blood stream—whose function it is to come to the bacteria and collect them. That is almost entirely a mechanistic process and they have the property of furnishing a chemical that will dissolve, digest and paralyze certain of the bacteria. What is the reason that you, for example, will not be particularly subject to a certain infection that will be perhaps very natural to a certain group of people living in some other district? Let us take, for example, the white plague. You realize that certain peoples are more susceptible than others. Some have a chemistry that is already built up which will attack the first organism or protein that gets in from that organism, and destroy it immediately, while others would not have that chemistry. In other words, as we will see tomorrow night, we actually inherit a preparation, a sort of chemistry, that will prepare us for it. You take the measles; it is almost always fatal to the Eskimo. It is not so with us; we have somewhat of an immunity. Syphilis does not hurt the Chinese much; it is quite destructive to the ordinary Caucasian and it is absolutely fatal to the Eskimo. Why? Because these different peoples have built up, or failed to build up, a resistance to that particular infection. An ordinary sheep will die of anthrax, while certain wild sheep living in the hills never get anthrax; you could not inoculate them with it. Why? They have built up an immunity to it. What is an immunity? You cannot have immunity to typhoid without having had typhoid fever or your ancestors having had typhoid fever. The very reason that I have a chemistry to fight any particular contagious and infectious disease is the proof that I have had that protein in my blood and have acquired the chemistry to destroy it and that is the reason we do not die of mouth infection. We have a mouth infection continually with us and it has built up within us a resistance to it, and because we have a high resistance to it we escape its effect and take care of the poison. When it gets into the system it does not seriously attack us. But here is the tragedy of the whole mouth infection process: The organism that will attack us and produce a definite reaction and make our chemistry fight it, is not always the one that you are in most dread of. It is also those that do not irritate your body, and that includes strains from nearly all the streptococcus group. I repeat—the tragedy in the whole dental field of operation is that we are dealing with organisms with so low a virulence and irritating ability that when they get into the tissues at the apex of the tooth, they will lie there for years, even whatever time the patient may live, and produce no soreness or irritation observable on the outside, or to the patient. I say it is a tragedy for if it were worse it would be better. If they would make a bad sore at the apex of the root, nature would build up a resistance and fight, but because they have a low virulence and because they can live there without producing any local sore, they can produce a toxin which passes out into the blood or pass out themselves and select tissues.

Toxines have a selectivity for tissue. Did you ever have the mumps? If you take the organism for mumps and grow it outside of the body and inject it into animals, it will select the parotid glands and make them swell. If you inject that organism into a pregnant dog and then kill her, you will find the organisms not only in her parotid glands, but also those of the unborn pups. That organism has a selectivity for that particular tissue and its specific toxin has also. And when you have bacteria growing at the apex of a root and they produce a toxin, it may pass out and keep on irritating a special tissue. That irritation prepares that tissue for the invasion of that same organism and it may be a joint, it may be in the muscular tissue, it may be nerve tissue or it may be in the heart valve tissue, but with that toxin going through the system, its selectivity often precedes the infective process. So it is of very great importance and wonderfully significant that when a case of arthritis comes to us the lesion that we will look for and the one we will be most afraid of will not be the active inflammatory process or the abscess with the fistula, because that is not the type of organism such as seems most frequently to produce arthritis. The organism that will produce a quantity of pus sufficient to produce a fistula is not the type that produces arthritis; and you will see many of these cases like I saw last week of a man who was carried into the Research Institute—we have a number of them carried there because they cannot walk—with ten abscesses at the apices of roots and only three with fistulas, and I will show you the case of a woman, who is now walking and who has not for years, where there were five infected areas and only one with a fistula. What is the tragedy? The tragedy is that the strain of organisms that we are most concerned about is the one that produces no appreciable sore; the tooth is never even lame. There may be but a very slight area of absorption about it.

The first case I will show you is an illustration of this selectivity. This man, about fifty years of age, has been out of employment for four years, has been incapacitated so that he has been in hospitals a great deal of the time for two years and the symptoms have been those of a liver and stomach disturbance. A careful study of his body by different men revealed no local source of infection. One or two physical examinations were made and we found an area of absorption about two of the lower incisors. He gives a history of having had a boil on his chin about twenty years previously. The significant thing is that one of these teeth had been treated and the other had not. We took a strain of germs from this dead pulp canal and inoculated white rats with them, with the results shown in the next slide, a selectivity in these animals for the liver. Remember, this man had been taken to the hospital for gall stones; they decided not to operate at that time. The next slide shows two things that are important, not only the characteristic infected area forming a miliary abscess but also a blocked blood vessel. Note the mechanism of this—that there has apparently been a stoppage of the blood vessel and the infection arose around it. The organisms within this occluded blood vessel had the ability because of their digestive fluids to digest the tissues of the liver; they possibly could not digest any other tissue of that man's body, and they form multiple miliary abscesses all through the liver. With no other treatment than the treating of these teeth, which was done by treating and filling the roots, and root amputation, that man gained so rapidly that in six weeks he was back managing his business, working from seven o'clock in the morning until eleven o'clock at night. He lived in another city and his physician called me on the long distance telephone to tell me that he had no doubt but we had found the cause of his trouble. Why this selectivity? The organisms growing in that environment all that time probably covering twenty years, had developed a particular type of toxin which selected the liver tissue as did also the invading organisms, and continually produced the irritation and destruction in this tissue. We may have other tissue selected as we indeed often do.

(To be continued)

Isn't it high time that the root-canal problem be given a short vacation for better assimilation, and that a little attention be given to the subject of artificial dentures made by the dentist, rather than for him by the office boy or the commercial laboratory? Let's stop making plates at so much per and give our patients the highest type of service known to the profession for a dignified professional fee.—*N. S. Hoff, Dental Register.*

THE TECHNIC OF PREVENTIVE DENTISTRY FOR CHILDREN*

BY MARY E. ALLEYNE, D.D.S., DETROIT, MICH.

IN GIVING this clinic it is my purpose to impress upon each individual the importance of starting at the earliest possible moment with the care of the children's teeth, if we would have them reach adult life with at least a fairly good set of teeth, for we have all seen faulty conditions many times in adult mouths which could have been largely, if not wholly, prevented in the child. Now, I find in my own practice the best time to start in with the child is at the age of two and one-half years, or when the temporary teeth are in their respective places. During this first visit I gain the confidence of the child, thus eliminating all fear of the dental chair, and proceed to polish all surfaces of teeth as thoroughly as possible. Then I see if all surfaces are perfectly calcified and note how deeply grooved the sulci in molars are. At this time I try to impress on the nurse or mother the importance of ideal home care three times a day, brushing the teeth properly each time, with flossing on the mesial and distal surfaces of the molars once a day. If the sulci in molars are well calcified, I explain that by thorough brushing, these surfaces can be kept clean and free from decay, at least to a large extent, until such time as these teeth should come out to make room for the permanent bicuspids, but if I find on subsequent treatment that I am not having perfect co-operation in the home care, I then proceed to flush all the molar sulci with cement so that if food particles are allowed to remain in the mouth for any time, it will rest on a cement surface and not come in direct contact with the enamel surface, for we know these are the teeth necessary for mastication from two and a half to eleven years of age.

Now, with four prophylaxis treatments a year and the guarding of the sulci in temporary molars till the child reaches the age of six years, I find we can keep their teeth in a fair state of health and in many cases almost perfect. Upon the eruption of the sixth year or first permanent molars, I increase my care by more frequent prophylaxis treatments every two months at least, and again instruction is given nurse or mother regarding the flossing of the mesial surface, particularly of the sixth-year molar. This, with care of the sulci, preserves these teeth intact during their period of eruption, as it is here we find the greatest care necessary, because the gum covering the greater part of the tooth. This, together with the impossibility of the brush reaching the tooth surface which is not on a line with the temporary molars, consequently the patient is unable to keep these teeth in any degree of cleanliness to prevent decay at this time. After this tooth has erupted far enough above the gum I dry the tooth thoroughly and flow in beneath the flap of gum tissue a thin cement to more carefully guard the sulci till such time as the gum has completely absorbed and the tooth has reached its normal position. This method of treatment I have found protects the tooth surface at a time when I feel sure it is most liable to decay.

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*Given as a clinic, Michigan State Dental Society.

With the eruption of the permanent teeth from this age on, we should guard the teeth as far as possible by frequent prophylaxis treatment and proper home care, thus keeping them in a highly polished condition and preventing to a great extent the possibility of rapid decay.

With such systematic treatment carried out until the boy or girl reaches the age of fourteen years, or when all permanent teeth are in place, we should at least hope to have preserved their teeth till they reach adult life in a more perfect state of preservation than many cases we have seen from time to time.

A SIMPLE SPLINT FOR INFERIOR MAXILLA

BY DR. ADOLPH GROPPER, MILWAUKEE, WIS.

The splint is constructed by banding one or more teeth on each side of the fracture in close proximity to the fracture, one or more teeth on each side at a distance from the fracture. Place these bands on the teeth and adjust a roll of impression compound not over three-eighths of an inch in diameter, in the same manner as for taking a bite. Do not allow the compound to extend buccally or labially beyond the buccal or labial line of the masticating surfaces of the teeth. Reduce the fracture by bringing the lower jaw up against the upper until the teeth are in perfect occlusion; then adjust another roll of impression compound of about the same dimension against the labial and buccal side of the teeth, when the compound has been chilled, remove both occlusal, labial and buccal impression, adjust the bands to their proper places in the impression and run up the models in an articulator.

Adjust a heavy half-round bar (the flat side against the teeth) from molar band on the right side labially to molar band on the left side; a similar bar lingually from molar band on right side lingually to molar band on the left side, invest the case and solder the bars to bands, using a sufficient quantity of solder to construct a rigid appliance. This appliance constructed of sterling silver will have the rigidity required.

When completed ready for setting, the teeth to which bands have been fitted should be thoroughly cleansed with pumice and alcohol to remove all fatty deposit; the bands are then filled with a surplus of cement, the anchorage teeth covered with cement, the appliance adjusted to place and the fracture reduced by bringing the lower teeth into the articulation with the upper teeth. A bandage is applied to remain from six to eight hours, when the same can be removed with perfect safety and the patient dismissed to return for inspection only, until the time for the removal of the appliance.

Goldsmith Building.

SOME USES OF AMALGAMATED GOLD*

BY R. C. HARKRADER, D.D.S., CINCINNATI, OHIO

The object of this clinic is to show how amalgamated gold foil may be used in the making of small gold inlays, repairing ill-fitting margins of cast gold inlays, and filling pits in solder operations.

Any cohesive gold foil may be selected and a few pellets placed in a clean mortar and enough mercury added to insure amalgamation without using the pestle. After all pellets have been amalgamated the mass is poured into a chamois bag and the excess removed by squeezing with a pair of pliers.

In making small cervical inlays or simple occlusal inlays, forty-four gauge pure gold is burnished into the cavity, special care being taken to see that the gold is properly adapted to the margin. This matrix is then filled one-third full of the amalgamated gold and removed from the cavity. It is then placed on a heater with a very small flame and the mercury very slowly volatilized, great care being used not to drive off the mercury too fast. When the mass regains its original gold color, the matrix may be placed back in the cavity, re-burnished to overcome the slight shrinkage and more amalgamated gold added. This procedure is repeated until the cavity is filled and then the inlay can be polished and set.

If for any reason the margin of a cast gold inlay is defective, the inlay can be placed in the cavity and amalgamated gold can be burnished into the space between the inlay and the cavity margin and the entire mass removed and heated very slowly. If marked shrinkage occurs, more amalgamated gold can be added. Should the added part of the inlay be subjected to the strain of mastication, it should be reinforced by solder.

Where pits are found after solder operations they should be thoroughly cleansed with a bur and filled with amalgamated gold. The appliance, although it may contain facings, can be very slowly heated and the mercury volatilized.

Amalgamated gold may be employed in the repair of gold crowns, making contact points and repairing solder joint Richmond crowns where the solder failed to reach the labial. None of this amalgamated gold need be wasted, for should any remain, more mercury can be added and re-amalgamation takes place.

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*Clinic given before the Cincinnati Dental Society.

ORAL SURGERY
CASE REPORTS

CONDUCTED BY HUGH W. MacMILLAN, D. D. S., CINCINNATI, OHIO
THIS DEPARTMENT AIMS TO REPORT INTERESTING ORAL SURGERY CASES IN BRIEF FORM, ILLUSTRATED BY RADIOGRAPHS AND PHOTOGRAPHS WHERE POSSIBLE. ARTICLES FOR THIS DEPARTMENT MUST NOT BE MORE THAN 500 WORDS IN LENGTH. SEND CONTRIBUTIONS TO DR. HUGH W. MACMILLAN, UNION CENTRAL BUILDING, CINCINNATI, OHIO.

CASE I. BADLY INFECTED FRACTURE OF THE LOWER JAW

J. D., age 45, was hit by an automobile when stepping from a street car. He received a gash in the left side of face extending from lower lip down under chin, around base of the neck and up through cheek. The tissues were torn, exposing the larynx and end of the hyoid bone. The lower jaw was fractured on the left side between the first and second molars and between the second and third molars, leaving a section of the bone containing the lower second molar unattached to the anterior and posterior fragments.

Fig. 1. Case I.—Sequestrum before removal.

The wound was sewed up and treated. The jaws were splinted temporarily by ligating the teeth, as the fracture was badly infected and pus discharged from five fistulæ. Four months after patient began treatment the part between the fracture had become a sequestrum and was removed. The third molar was extracted shortly afterwards. Following this the patient made a slow recovery with very little deformity, considering the unfavorable prognosis.

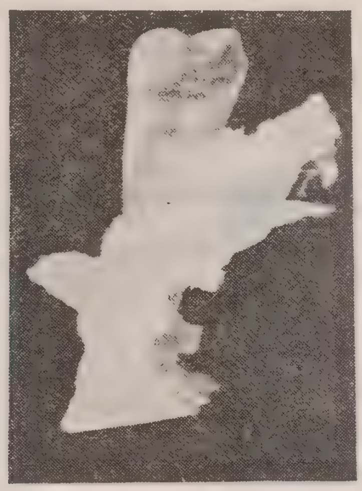


Fig. 2. Case I.—Sequestrum after removal.

CASE II. AN UPPER FOURTH MOLAR

Mrs. F., age 29, had complained for some time of severe neuralgia which had not responded to treatment. Radiographs showed an impacted upper third molar complicated by an impacted fourth molar which was situated above and in the posterior wall of the antrum. The two impacted molars were removed easily with the aid of conductive anesthesia. The fourth molar was perfectly formed except for a deflection of the root. The neuralgia disappeared.

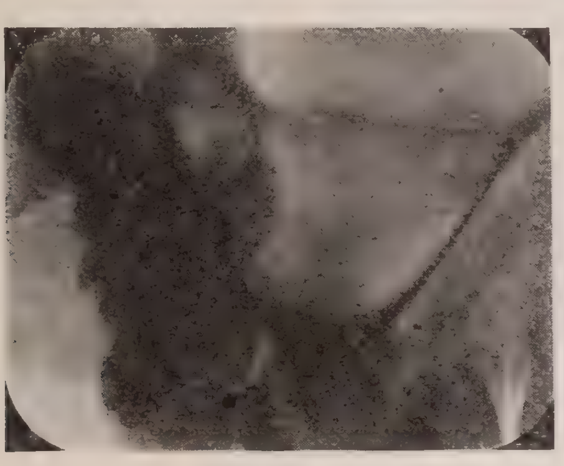


Fig. 3. Case II

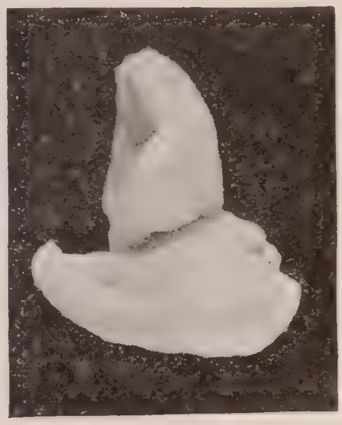


Fig. 4. Case II

Fig. 3. Case II; Fig. 4. Case II.—Relative position and size of third and fourth molar.

CASE III. ILLUSTRATING MISINTERPRETATION OF RADIOGRAPHS

Mrs. L. P., age 25, had been troubled for two years by a pimple forming in the philtrum. It would gradually swell and cause considerable pain. To get relief the patient would open the swelling and drain out the pus. Several men had treated the lip by opening and cauterizing the area, by applying plasters, by using electricity, and finally by opening a dead central incisor and, as the patient said, "forcing a liquid through." After this the swelling stopped for two months, when the patient was referred to me. The lip was distended and pus was present when the lip was opened. Radiographs were taken (*Fig.* 5) which showed a dense area in the region of the apex of the tooth which had been extracted. Thinking that the dense area was a portion of some filling which had been forced through in the treatment of the tooth, I anesthetized the part with novocain and opened up the area around the alveolus, burring out all the bone in that region, but could find no evidence of the dense object apparent in the radiograph. Another radiograph was taken and showed the same dense area. Finally a radiograph was taken of the lip (*Fig.* 6). This showed an object embedded midway in the tissues. A wire was placed into some adhesive tape and stuck on the lip to localize the area and another radiograph was taken (*Fig.* 7). An incision was then made in the lip and a calcific nodule was removed. It probably was a calcareous deposit which had formed in a mucous gland. Following this the lip healed and the swelling has not returned.

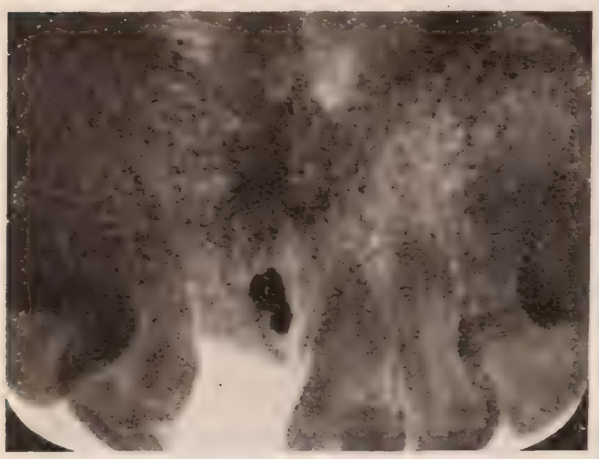


Fig. 5. Case III

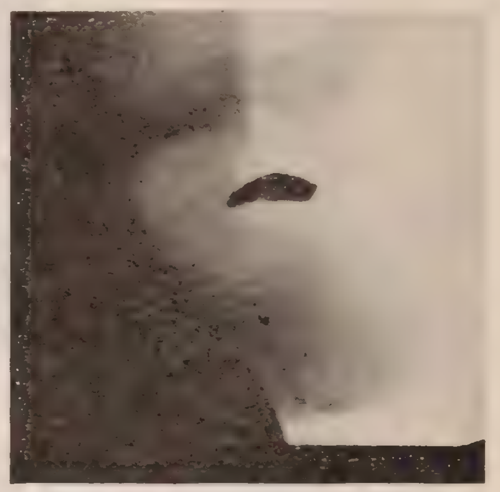


Fig. 6. Case III

Fig. 5. Case III.—Dense object seemingly in alveolus of extracted tooth.
Fig. 6. Case III.—Dense area shown in lip.

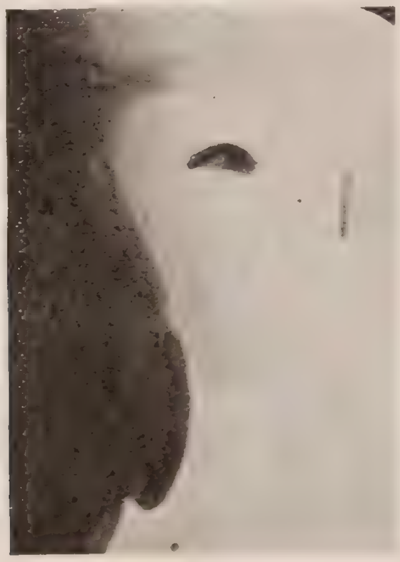


Fig. 7. Case III.—Wire helps to localize object.

Cases reported by Dr. Hugh W. MacMillan.

EDITORIAL

THE DENTAL RESERVE CORPS OF THE ARMY

Have you joined the Dental Reserve Corps of the Army? We understand that the government wants from one thousand to two thousand qualified men right away. Many dentists have enlisted already. Men who want to qualify must be ethical practitioners in good standing. It is the desire of the government to get men who can leave practice at once and go into service. Medical men are responding spontaneously and dentists should do likewise. That our readers may know about the requirements, we append official information from the War Department:

"The National Defense Act of June 3, 1916, and the tentative regulations thereunder, provide for a dental section or branch of the Officers' Reserve Corps. The officers of the Dental Reserve Corps have the rank of first lieutenant, and are appointed and commissioned by the President, after having been found upon examination prescribed by him physically, mentally and morally qualified to hold such commissions. Commissions are issued for periods of five years, at the end of which time the officers may be re-commissioned subject to such further examinations and qualifications as the President may prescribe. They are subject to call for duty in time of actual or threatened hostilities only. While on active duty under such call they are entitled to the pay and allowances (including quarters, fuel and light) of their grade. They are entitled also to pension for disability incurred in the line of duty and while in active service. They are not entitled to pay or allowances except when in active service, nor to retirement or retired pay.

"Appointees must be citizens of the United States, between 22 and 55 years of age, must be graduates of standard dental colleges and must, at the time of appointment, be in the active practice of their profession in the states in which they reside.

"The examination is physical and professional. It is conducted by boards consisting in each case of one medical and two dental officers of the Army, designated by the War Department.

"The examination as to physical qualifications conforms to the standard required of recruits for the United States Army. Defects of vision resulting from errors of refraction which are not excessive, and which may be entirely corrected by glasses, do not disqualify unless they are due to or are accompanied by organic disease. Minor physical deficiencies may be waived.

"The professional examination will be oral. If the applicant fails therein he may, if he desires, have a written examination. An average of

75 per cent. is required to qualify in the examination. The examination comprises the following subjects:

1. Dental pathology and bacteriology.
2. Chemistry, physics and metallurgy.
3. Recent advances in dental surgery and technic.

"Applications for appointment in the Dental Reserve Corps must be made in writing, upon the prescribed blank form, to the Surgeon General of the Army, Washington, D. C., who will supply the blank upon request. The correctness of the statements made in the application must be sworn to by the applicant before a notary public or other official authorized by law to administer oaths. It must be accompanied by testimonials based upon personal acquaintance, from at least two reputable persons, as to the applicant's citizenship, character and habits, and by his personal history given in full upon the blank form furnished him for the purpose."

DR. E. C. KIRK HONORED

Dr. Edward C. Kirk, Dean of the Thos. W. Evans Dental Institute School of Philadelphia, has been appointed a member of the Medical Section of the Council of National Defense, Washington, D. C. We are glad that one so well qualified as Dr. Kirk has been chosen to fill this important position, and the dental profession will profit by his presence in the council.

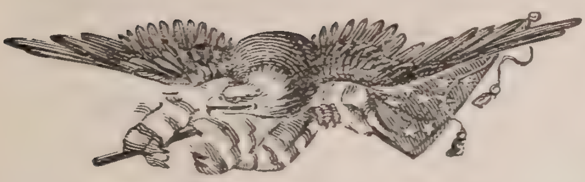
NEW LAW FOR INDIANA

The Indiana state association is to be congratulated on the passage of a new dental law, approved by the Governor, March 9. A digest of the new law will appear in the June issue of The Dental Summary. Declaring an emergency to exist, the new law became immediately effective.

Causes of Deaths in 1915

In a preliminary announcement issued by the Bureau of the Census, with reference to mortality in 1915, there are some interesting items. Deaths reported in the "registration area," which contains about 67 per cent. of the population, indicate that nearly one-third was due to three causes: Heart disease, tuberculosis and pneumonia. The death rate from the latter disease has shown a marked decline since 1900. From cancer, on the contrary, it has risen from 63 per 100,000 to 81.1 in the same time. Diarrhœa and enteritis, chiefly among infants under two years of age, have markedly decreased. Diabetes has nearly doubled in its death rate since 1900. Influenza, diphtheria and croup have declined more than 60 per cent., a relatively greater lessening than that shown by any other important cause of death except typhoid, which shows a decrease amounting to almost two-thirds. Measles has caused a greater number of deaths than scarlet fever; the rates for both diseases were the lowest since 1900. Whooping cough was more fatal than either.

"RALLY 'ROUND THE FLAG, BOYS!"



WARS are not won by brute force. If this were not true, the battle of the Marne, which rolled back the invaders of France, would have had a far different termination. The one factor seemingly neglected by the careful planning of forty years on the part of the Teutonic Powers was, as it still is, the Spirit of a Free People.

The Spirit that animated the men who founded this nation, the determination to win the right for each man to live a full and complete life regardless of governmental restrictions imposed by autocracy, this is the Spirit that is today animating the whole being of every true American, prompting each to offer the best that he has to promote, to a successful conclusion, the most just, most necessary war in which any nation ever has engaged.

As in the case of the revolutionary fathers, America has little to gain materially. The Colonists would, very likely, have been much better off materially, financially, had they remained quietly a dependency of the British Crown. But they chose to throw aside all thought of immediate and merely sordid gain in the hope of gaining for themselves and all mankind the right to Life, Liberty and the pursuit of Happiness, each in his own way.

It is that Spirit that is today abroad in our great land, impelling each to do the best he can to aid in the Great Work. And it is that Spirit that is sure, in the end, to prepare America for her part in the struggle as no other nation ever has been prepared.

We have learned much during the long months in which the heroic allies have held the hordes of Force almost passive in their trenches, while the people at home have been overcoming almost Herculean difficulties in the way of effective preparation. Among other things we have learned that guns and amunition, ships and even enlisted men, do not and cannot of themselves constitute efficiency, and that to win means for each to do his part in the direction of his own particular training.

An age-limit for enlisted men has been established; but there is no such limit so far as the vast majority of Americans is concerned. Each can do and must do his part. The farmer can increase his acreage; the miner can strike a few more blows with his pick, the blacksmith with his sledge; the speaker can emphasize his own patriotism in order to arouse that which may be slumbering in his hearers; the writer can reach thousands with his ringing sentences. And the dentist—what can he do? Much; very much indeed. The war thus far has shown one thing very clearly; that it is easier to make a soldier of a man without a rifle than it is to make an effective unit out of a man with poor teeth. Every dentist has it in his power to make at least one soldier a better soldier and a better man.

Individual willingness is, of course, the first essential; but, as in the case of every other good work that must be carried out on a large scale, organization is positively necessary. No reader of THE DENTAL SUMMARY or any other publication devoted to the interests of the dental profession, can be ignorant of the fact that an organization exists that has for its purpose the mobilization of the profession in the interests of national preparedness. This organization already has thousands of members and has done an immense amount of good work. But still there is room for more. In fact, every dentist who loves his country should enroll himself in the "Preparedness League of American Dentists." If YOU are not already a member, here is your opportunity to get RIGHT.

Fill up the blank below, cut it out and mail to address given, not forgetting the membership fee. DO IT NOW!

APPLICATION BLANK
TO THE
PREPAREDNESS LEAGUE OF AMERICAN DENTISTS
3 Professional Bldg., 131 Allen St., Buffalo, N.Y.

I hereby make application for ACTIVE MEMBERSHIP in the Preparedness League of American Dentists, which entitles me to all the benefits and privileges of the organization.

Enclosed find $1.00 (One Dollar).

No dues or assessments.

Signed..............................

Please write name ....
and address plainly. ....

The Importance of Prosthetics

There is no more important service the dentist is called upon to render than the adaptation of plate dentures, and there is probably no service more difficult to render satisfactorily, and yet it is the one service we are willing to slight if we do it ourselves, and one which we are willing to trust to almost anyone who will do it the cheapest.—*N. S. Hoff, Dental Cosmos.*

SOCIETY·ANNOUNCEMENTS

Northern Ohio

The sixtieth annual meeting of the Northern Ohio Dental Association will be held June 7th, 8th and 9th, 1917, at Hotel Statler, Cleveland, Ohio.

An especially attractive program has been arranged. The following subjects will be covered by capable men in their respective lines: Removable Bridges; Partial Dentures; Complete Porcelain Technic, handled by an essayist and seven clinicians, covering impression taking and model making for indirect method and the various steps leading to the finished pieces, including porcelain inlay or jacket crown; Dental War Surgery, covered by one who has been on the field; Root Canals; Special Descriptive Lectures; Progressive Clinics; Golf Tournament. Other forms of entertainment.

C. H. Clark, *Secy.*

Michigan State Board

The next Regular Meeting of the Michigan State Board of Dental Examiners will be held in the City of Ann Arbor, in the Dental Building of the Dental Department of the University of Michigan, June 18th to 23rd, both inclusive. This meeting will be held for the purpose of offering an examination to all eligible candidates who wish to apply for a license to practice dentistry in the state of Michigan. All candidates must furnish the Secretary with application and fee not later than ten days prior to examination. Applications and all other information may be obtained by addressing the Secretary-Treasurer.

E. O. Gillespie, Stephenson, Mich.

Lake Erie Association

The fifty-fourth annual meeting of the Lake Erie Dental Association will be held at the Hotel Barlett, Cambridge Springs, Pa., on May 24th, 25th and 26th, 1917. D. S. Sterrett, *Secy.*

Indiana State

The fifty-ninth annual meeting of the Indiana State Dental Association will be held at the Claypool Hotel in Indianapolis, on May 15-16-17. A very good program of papers and clinics has been prepared and a sincere invitation is extended to members of other state dental associations to attend.

A. R. Ross, *Secy.*

Illinois State

The fifty-third annual meeting of the Illinois State Dental Society will be held in Quincy, Ill., May 8, 9, 10, 11, 1917.

Henry L. Whipple, *Pres.*, Quincy, Ill.
J. P. Luthringer, *Secy.*

New Mexico State Society

The annual meeting of the New Mexico State Dental Society will be held at Albuquerque, N. M., June 25, 26 and 27. Papers and clinics of unusual interest have been secured. All ethical dentists are invited to attend and take part.

C. A. Eller, *Pres.*, Albuquerque, N. M.
J. J. Clark, *Sec.-Treas.*

North Carolina State Board

The next meeting of the North Carolina State Board of Dental Examiners will be held at Durham, N. C., beginning promptly at 9:00 o'clock on Monday morning, June 25, 1917. For further information and application blanks address the secretary, F. L. Hunt, Secy., Asheville, N. C.

South Carolina State Board

The next annual meeting of the South Carolina State Board of Dental Examiners will be held at the Jefferson Hotel, Columbia, S. C., beginning promptly at 9 o'clock Tuesday morning, June 26th, 1917. All applications must be in the hands of the secretary by June 16th.

Application blanks and full information may be obtained by addressing,

R. L. Spencer, *Secy.* Bennettsville, S. C.

Rhode Island Board of Registration in Dentistry

The Rhode Island Board of Dental Examiners will hold its next examinations on July 5, 6, 7, 1917, in the State House in Providence. For further information, address,

Ernest A. Charbonnel, *Secy.*,
139 Mathewson street, Providence, R. I.

Georgia State

The forty-eighth annual meeting of the Georgia State Dental Society will be held at Brunswick, Ga., June 14, 15 and 16, beginning Thursday, June 14th. We extend a most cordial invitation to members of other associations to meet with us. For application blanks and full particulars, address,

M. M. Forbes, *Secy.*
803-04 Candler Bldg., Atlanta, Ga.

American Society of Anesthetists

The American Association of Anesthetics will meet in New York City, June 2, just previous to the meeting of the American Medical Association. The scientific program and dinner will be held in the Hotel McAlpin. The sessions will take place from 9:00 to 12:00 A.M., and 2:00 to 5:00 P.M., the banquet following immediately the same evening.

The first two days of the meeting of the American Medical Association, June 4-5, will be devoted to clinics, during which arrangements have been made for the demonstration of the latest and most improved methods of anesthesia and analgesia. There will also be a joint session with the Sections of Physiology and Pathology and General and Abdominal Surgery, during which several very important papers on anesthesia will be read, among them the following: "Shock," F. C. Mann, Rochester; "Pathological Pulmonary Changes During Endotracheal Anesthesia for Experimental Lung Surgery," Conrad George, Jr., Ann Arbor, Mich.; "Further Observations on the Teaching of Anesthesia in Relation to Surgical Physiology and Pathology," Willis D. Gatch, Indianapolis, Ind.; "Toxic Effects of Certain Common Anesthetics," Evarts A. Graham, Mason City, Iowa.

All those interested in attending the New York meeting should make their hotel reservations at once, and get in touch with Dr. James T. Gwathmey, secretary, 40 East 41st street, New York City, for further particulars.

The Interstate Association of Anesthetists will meet in Toledo, Ohio, October 9, 10 and 11, in conjunction with the Mississippi Valley Medical Association. Details of this meeting will be published later.

PROGRAM, SECTION ON STOMATOLOGY, AMERICAN MEDICAL ASSOCIATION

WEDNESDAY, JUNE 6TH, 9:00 A.M.

1. Chairman's Address—"Radiographic and Microscopic Studies of the Tissues Involved in Chronic Mouth Infections"—*Dr. Arthur D. Black, Chicago, Ill.*
2. "Chronic Diseases of the Mouth of Interest to Both Physician and the Dentist."—*Dr. Kurt H. Thoma, Boston, Mass.*
3. "Cysts of the Dental System."—*Dr. Kaethe W. Dewey, Chicago, Ill.*
4. "A Study of the Infectious Granular Tissue Found at the Apices of Pulpless Teeth, Commonly Called Chronic or Blind Abscesses." —*Dr. Herbert A. Potts, Chicago, Ill.*
5. "The Relation of Devitalized Teeth Without Danger of Focal Infection." —*Dr. M. L. Rhein, New York City.*

WEDNESDAY, JUNE 6TH, 2:00 P.M.

6. "Epithelioma or Cancer of the Mouth."—*Dr. L. Duncan Bulkley, New York City.*
7. "Treatment of Cancer of the Mouth by Electrical Cautery, With or Without Operative Measures."—*Drs. J. W. Bransfield and G. M. Dorrance, Philadelphia.* Discussers: *Drs. Albert Ochsner, Chicago, Ill; Joseph Bloodgood, Baltimore, Md.*
8. "Injuries of Temporo-Maxillary Articulation, Their Diagnosis and Treatment."—*Dr. Henry S. Dunning, New York City.*
9. "Tuberculosis of the Tongue."—*Drs. John W. Means and Jonathan Forman, Columbus, Ohio.*

THURSDAY, JUNE 7TH, 9:00 A.M.

10. "Bone Surgery as Applied to the Jaws, with Special Reference to Bone Regeneration."—*Dr. M. I. Schamberg, New York City.*

11. "A Composite Osteoplastic Closure of the Clefts of the Hard Palate." —*Dr. John B. Roberts, Philadelphia, Pa.*
12. "The Use of Soup Bone for the Correction of Deformities or Defects of the Skull and Face."—*Dr. Wayne W. Babcock, Philadelphia, Pa.* Discussers: *Drs. Allen B. Kanavel and Frederick R. Moorehead, Chicago, Ill.; Dr. Geo. V. I. Brown, Milwaukee, Wis.; Dr. Thomas L. Gilmer, Chicago, Ill.*
13. "A New Operation for the Immediate Surgical Separation of the Superior Maxillary Bones to Widen the Nares for the Improvement of Respiratory and Other Conditions."—*Dr. Geo. V. I. Brown, Milwaukee, Wis.* Discussers: *Dr. J. S. Evans, Madison, Wis.; Dr. G. L. Bellis, Wauwatosa, Wis.; Dr. O. H. Foerster, Milwaukee, Wis.; Dr. D. F. MacMillan, Chicago, Ill.*

THURSDAY, JUNE 7TH, 2:00 P.M.

14. "War Experiences with Wounds of the Head, Face and Jaws." —*Dr. Joseph Eastman, Indianapolis, Ind.* Discussers: *Dr. Henry H. Lyle, New York City; Dr. Geo. G. Davis, Chicago, Ill., Dr. Kellogg Speed, Chicago, Ill.*
15. "A Preliminary Report of Investigations as to the Frequency of Metastatic Eye Infections from Primary Dental Foci." —*Dr. Joseph M. Levy, New York City.*

All who are interested in the program are invited to be present and take part in the discussions.

ARTHUR D. BLACK, *Chairman,*
EUGENE S. TALBOT, *Secy.*

Four States Post Graduate Dental Meeting

Alabama - Mississippi - Texas - Louisiana

The special instructors positively engaged to date are: Dr. Arthur E. Smith, of Chicago, on "Nerve Blocking;" Dr. Carl D. Lucas, of Indianapolis, on "Apiectomy, Periodontia, Prophylaxis and Exodontia;" Dr. Norman Beverly Nesbett, of Boston, on "Removable Bridge Work Without Mutilation of Sound Teeth;" Dr. Alonzo Milton Nodine, of New York, on "Radiography, Ionic Medication, Root-Canal Preparation and Filling, and Stomatology." In addition there will be several motion picture films.

If you are interested in seeing what your financial assistance has helped to make possible in the great war hospitals of Europe, come and see what your money and American genius has helped to do. At this great meeting will be exhibited several of the moving picture films taken of operations, such as American methods of bone grafting, as performed in European war hospitals by Dr. F. H. Albee, of New York; the great Dr. Alex Carrel, of the Rockefeller Institute of New York, demonstrating his latest methods, using the wonderful antiseptic solution of Dr. Dakin (also an American), by the aid of which badly infected wounds are disinfected and the exact date upon which healing will be complete is predicted with almost infallible accuracy; plastic surgery of the face and jaws by Dr. Pont, at Lyons; extracting a shrapnel ball from the region of the heart, by Prof. O. Laurent, at Grand Palais.

There will be also several other films of strictly dental interest, among which we may have the following: The Use of Angle's New Appliances for the Correction of Malocclusion of the Teeth, by Dr. E. H. Angle; The Advantages of One-Pin Teeth over Two-Pin Teeth; The Extraction of Teeth Under Nitrous Oxid Anesthesia, by Dr. J. D. Thomas; Periodontia Clinic; Prophylaxis for Pyorrhea, by Dr. Paul L. Stillman; Angle's Original Method of Taking Impressions; Apiectomy, by Dr. Joseph M. Levy; Root Amputation, by Dr. A. Berger.

The last day of the meeting will be devoted entirely to clinics, and the progressive plan which has proven so satisfactory wherever used, will be adopted. The audience will be divided into classes of sufficient number so as to enable each and every member to see and hear everything the clinician has to offer.

By the way, have you registered yet? If not, *do so at once.* Dr. C. V. Vignes, Macheca Bldg., New Orleans, La., the chairman of the Committee on Registration and Credentials, wishes to emphasize the fact that places in the classes for special detailed technical courses following the general meeting, will be assigned in order of registration. If you register late, you may find that the class in which you most desire a special course is already full, and you may thus be shut out. You should act quickly.

Dr. C. S. Tuller, chairman of the Committee on Exhibits, promises that the exhibits to be shown at this meeting will rival the great Manufacturers' Exhibit held in New Orleans some years ago.

An early estimate predicted forty-five exhibitors, and present indications point to seventy-five. Nearly every thing the dentist uses will be shown in its latest form.

Badges will be provided for each member, visitor and exhibitor, which can only be had by showing your registration card, and must be worn by the owner before admission will be granted. Special meeting places will be provided for the dental fraternities. Dr. O. Loeffel, chairman of the Committee on Arrangements, Railroads and Hotel Rates, has gone to no little trouble in getting the special railroad and hotel rates.

Now, doctor, come on, get in the band wagon. You have never had an opportunity equal to it offered in the South before.

J. P. Wahl,
Chairman Publicity Committee.

Pennsylvania State Board

The next examination of the Pennsylvania Board of Dental Examiners will be held in Music Fund Hall, 808 Locust street, Philadelphia, and the College of Pharmacy Building, Pittsburgh, on Wednesday, Thursday, Friday and Saturday, June 13th, 14th, 15th and 16th, 1917. The examination in operative dentistry will be held on Wednesday, June 13th, at 8:30 o'clock, in the Evans Dental Institute, 40th and Spruce street, Philadelphia, and the University of Pittsburgh Dental Building, Pittsburgh. The examination in prosthetic dentistry will be held on Wednesday at 1:30. Application papers can be secured from the Department of Public Instruction, Harrisburg, For further information address the secretary, Alexander H. Reynolds, 4630 Chester Ave., Philadelphia.

Nebraska Board of Dental Secretaries

The Nebraska Board of Dental Secretaries will hold their next regular meeting beginning at noon, June 7th, to June 16th, inclusive, except Sunday.

June 7, 8, 9 practical examination will be given to this year's graduates of Omaha Creighton Dental College and Lincoln Dental College. All others will begin their examination Monday morning, June 11, at 8:30, in the State Capitol Building, Lincoln. For further information, address,

S. A. Allen, *Sec.-Treas.*, Loup City, Neb.

American Medical Association

Clinical Congress, June 4, 5

The American Medical Association will hold its annual meeting in New York City, June 4 to 8. In all probability this is to be the greatest meeting of medical men ever held in this country. The committee on arrangements consists of Drs. Wendell C. Phillips, Floyd M. Crandall and Alexander Lambert. Headquarters have been established at 17 West 43d street, New York City, to which all communications should be addressed. Monday and

Tuesday, June 4th and 5th, will be devoted to a Clinical Congress, in which all departments of medicine will be represented, each department to have its own series of clinics, occurring in different parts of the city.

The great number of clinics, their scope and scientific value, will be unprecedented. The program is in active preparation, soon to appear in full in the *Journal* of the A.M.A.

Between seven and ten thousand physicians are expected to attend this Congress, and it is hoped that dental practitioners throughout the country will avail of this opportunity to become Associate Fellows of the Section on Stomatology, and thus be entitled to attend these clinics as well as the regular meeting of the Association on June 6 and 8. The following is quoted from a letter from the General Secretary:

> Dentists holding the degree of D.D.S. who are members of state or local dental societies and who are not eligible to regular membership, may be elected to Associate Fellowship by the House of Delegates of the American Medical Association when a formal application for such Associate Fellowship has been approved by the Section on Stomatology. In other words, when a dentist holding the required degree makes formal application for Association Fellowship, accompanying this application with a certificate from the secretary of his state or local dental society, which certificate certifies to his being a member in good standing in that body, this application and the attached certificate is forwarded to the secretary of the Section on Stomatology for the approval of that Section. The application is then in form for presentation to the House of Delegates for the election or rejection of the applicant.
>
> We will be glad to transmit any such applications, or they may be sent direct to the secretary of the Section on Stomatology, Dr. Eugene S. Talbot, 31 North State street, Chicago, Ill.

Headquarters of the Section on Stomatology will be at the Hotel Astor, Broadway and 45th street.

No more impressive opportunity for the fraternization of dental and medical men has ever been presented in the history of the profession. Every dentist who reads this announcement should enroll immediately in the Section on Stomatology (annual dues, $5, which entitles him to the *Weekly Journal of the A.M.A.*), and thus place himself in direct touch with the greatest happenings in medical science.

HENRY W. GILLETT, HENRY S. DUNNING,
ARTHUR L. SWIFT, ARTHUR H. MERRITT,
WILLIAM D. TRACY, WILLIAM B. DUNNING,
Clinical Com., Sec. on Stomatology, *Chairman.*
140 West 57th St., New York City.

North Dakota State

The North Dakota State Dental Association meets in Fargo, May 15th and 16th, 1917. Good clinics and exhibits by manufacturers. All members of the National Dental Association or any state society are cordially invited to attend. Solon Crum, *Secy.*

Iowa State Board

The next meeting of the Iowa State Board of Dental Examiners for the examination of candidates will be held at Iowa City, Iowa, commencing Monday, June 4th, 1917, at 9:00 a.m. For further information and application blanks address the secretary, Dr. J. A. West,
417 Utica Bldg., Des Moines, Iowa.

Arkansas State Board

The Arkansas State Board of Dental Examiners will hold its annual meeting and examination at the Marion Hotel in Little Rock, Arkansas, on Thursday, Friday and Saturday, June 21st, 22d and 23d.

Applicant for examination must be a graduate of a reputable dental school. Examination, theoretical and practical. Fee and application should be filed as soon as convenient and at latest ten days before the examination. For further information, address,

Dr. I. M. Sternberg, *Secy.*,
Ft. Smith, Ark.

Wisconsin State Board

The Wisconsin State Board of Dental Examiners will meet to give examinations at Berlin Arcade Hall (fourth floor), corner 3rd and North, Milwaukee, Wis., beginning June 20th at 9:00 o'clock a. m. Application with fees and necessary preliminary credentials must be sent in to the secretary twenty days before examination. F. A. Tate, D.D.S., *Secy.*

Connecticut State

The fifty-third annual meeting of the Connecticut State Dental Association will be held at the Hotel Griswold, New London, Conn., June 14th, 15th and 16th, 1917. Geo. S. B. Leonard, *Secy.*

California State

The California State Dental Association will hold its regular annual session for the year 1917 in San Francisco, June 6, 7, 8 and 9. A cordial invitation is extended to members of other associations.

For further information and particulars regarding exhibit space, communicate with the secretary, John E. Gurley, 350 Post street, San Francisco, Cal.

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

FIRST MEMBER OF THE PREPAREDNESS LEAGUE OF AMERICAN DENTISTS
PAUL REVERE
DENTIST

LACONIGRAMS

A guest from the South left a Toledo hotel the other day because no evidence of patriotism was visible to the naked eye in the form of Old Glory. Good. Too many people are hiding their light under a bushel of business these days. Too many seem to be fearful of offending the sensitive hyphenate. The time for that sort of selfish namby-pambyism has passed. We are a nation at war quite as much with foes within as foes without.

President Wilson has issued a proclamation defining treason as set out in U. S. statutes. Here is the gist of i*. Cut it out, read it often, and see that you do your part in preventing the manifestation of any form of traitorous activity:

> "The courts of the United States have stated the following acts to be treasonable:
>
> "The use or attempted use of any force or violence against the government of the United States or its military or naval forces;
>
> "The acquisition, use or disposal of any property with knowledge that it is to be or with intent that it shall be, of assistance to the enemy in their hostilities against the United States;
>
> PUBLISHING INFORMATION
>
> "The performance of any act or the publication of statements or information which will give or supply, in any way, aid and comfort to the enemies of the United States;
>
> "The direction, aiding, counseling or countenancing of any of the foregoing acts.
>
> "Such acts are held to be treasonable whether committed within the United States or elsewhere; whether committed by a citizen of the United States or by an alien domiciled, or residing, in the United States, inasmuch as resident aliens, as well as citizens, owe allegiance to the United States and its laws.
>
> GUILTY OF MISPRISION
>
> "Any such citizen or alien who has knowledge of the commission of such acts and conceals and does not make known the facts to the officials named in section 3, of the Penal code, is guilty of misprision of treason."

The Preparedness League of American Dentis aims to furnish every Red Cross base hospital wit a fully competent force of working dentists. your name enrolled?

Dr. Frank W. Sage has an article in this numb that every dentist, particularly every young denti and dental student, would do well to read an ponder well. Some day a Chair of Dental Economi is going to be forced upon the dental colleges, an men called to fill those chairs who know somethi about the subject. I nominate Dr. Sage for t first vacancy.

Now, turn back and read the article by Dr. E. Beadles, Norfolk, Va., on the Cause of Pyorrhe Slowly common-sense views and conclusions a coming to the front, replacing the local-system bone of contention that has lain in the way of re investigation far too long.

The Ransom & Randolph Co. has announced the dental trade that Dr. George B. Martin Pyorrhea Treatment has been added to its line specialties. This is the same Dr. George Martin, Frankfort, Ind., who invented or di covered the cast gold inlay, and perfected t technic; and then taught it to his pupils in h post-graduate school, and gave it all to the profe sion without money and without price. And this many years before the attempt to mulct t profession had entered the minds of others. I ca say to all my friends that I have entire faith in D Martin's Pyorrhea Treatment. He has used it f thirty-three years; he has placed it in the hands hundreds of other dentists who have used it f many years; I myself have had it tested out specialists; and the results have been uniform successful. Dr. Martin reports not a single failu in thirty-three years, and stands willing to tre any case that other dentists care to submit to hi The treatment is simple, the technic within t reach of any dentist, results are certain and rapid- two to six treatments completing the course every case. This is not an advertisement, but t introduction to a subject upon which I expect have much to say later, a subject in which eve

THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS

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OFFICIAL ORGAN

The Ohio State Dental Society
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The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
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REGULAR CONTRIBUTIONS

DENTAL SERVICE IN THE ARMY*

BY MYRON T. HERRICK, CLEVELAND, OHIO

FORMER AMBASSADOR TO FRANCE AND EX-GOVERNOR OF OHIO

THESE ARE TIMES when courage is of great importance to the people of this country. I am astonished at my courage tonight. Many times I have found it extremely difficult and I have delayed for a long time for fear of meeting one dentist, and now here I face all of you.

The supreme importance of the care of the teeth never was better demonstrated than in a little incident which I happened to recall here tonight. It occurred in Paris; General Diaz, the ex-president of the Mexican Republic, was residing there after his resignation, and when the Mexican troubles were uppermost he spoke with a great deal of concern about his country, of his service for thirty years, how he had labored all those years for the benefit of the Mexican Republic, and he said: "I resigned one day; it did not seem to me so important—I could have put down that insurrection as I had put down worse insurrections. I wish I had not resigned; the reason I did, primarily was, that I had an ulcerated tooth, and I weakened."

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*Address before the Cleveland Dental Society, April 2, 1917.

I hope it will not be necessary to have an examination of any of our officials today in Congress or anywhere else, that they may not lose their nerve by reason of ulcerated teeth or anything of the sort.

I have before me a resolution, which many of you have read, which has been presented to Congress and which probably will meet with its approval.

It will give courage to the people of the whole country.

Let me read this resolution:

(RESOLUTION PRESENTED BY REP. FLOOD, OF VIRGINIA)

"*Whereas,* The recent course of the Imperial German Government is in fact nothing less than war against the government and people of the United States:

"*Resolved,* By the Senate and House of Representatives of the United States of America, in congress assembled, That the state of belligerency between the United States and the Imperial German Government which has thus been thrust upon the United States is hereby formally declared, and

"That the President be and he is hereby authorized to take immediate steps not only to put the country in a thorough state of defense but also to exert all of its power and employ all of its resources to carry on war against the Imperial German Government and to bring the conflict to a successful termination."

There will be a response, in my opinion, to that sentiment throughout the entire United States; in fact, that it simply is voicing the sentiments of the people of the United States.

This, my friends, is a sublime moment in which to live, a wonderful moment, when a whole people reaches that state of mind in which they feel that it is sublime to die in the service of their country. It is the revival of that sentiment which caused our forefathers to expatriate themselves and come over here to set up a kind of a government on the Western Hemisphere which we have learned to love and which has brought about this great civilization, and we are now just as ready to defend it as they were, or as the men of '61 were to fight for it.

I have a warm interest in what you have been doing, gentlemen. I happen to be a trustee of your Institute, and I have noted with pleasure and pride what is being undertaken there and what the dentists throughout the United States are doing, what your State and National Associations are accomplishing, and in this crisis the support which you offer is such as every citizen should give. You have undertaken a system of preparedness but I do not think you really appreciate the potentialities in what you are doing. I happened to see a good deal of this work in France at the beginning of the war, and I know what surgeons, doctors, dentists, nurses and people who are engaged in those lines of work have been able to accomplish. It is much easier, much more conspicuous to lead the charge, or to wear a brilliant uniform and do those things which have been written of warfare, but scientific preparation and the application of knowledge such as you possess is a service so effective and so far reaching that when the history of this war is written, those of your profession will find your names written high as those who served their fellow men.

At the beginning of the war, the first thought that occurred to men of your profession and of the medical profession, was of care for the wounded. It is that professional instinct which makes you desire to serve mankind in crises at all times. Through that instinct the American Ambulance Hospital near Paris was created. There was a great and wonderful building, the photographs of which have now become familiar to the people of America, just completed at Neuilly, the Lycee Pasteur. Two or three American physicians came and suggested they would like to turn the little existing American Hospital into a war hospital with some tents in the garden, to care for a few wounded. I went with the doctor who had suggested this to visit General Fevires, the head of sanitation in the French army, and he suggested that the Americans should take and equip and conduct as a hospital the Lycee Pasteur, which would accommodate some 1500 patients if fully equipped. He said he knew of American surgery, the American genius for organization, and though it required a large sum of money, as the Americans had evinced their desire to do something, he thought possibly it might be equipped through the people of our country quicker and made effective sooner, as the French were not quite ready to take care of themselves. They gave us an option for forty-eight hours. I am not going into the detail, but the requirements were that it should be underwritten for not less than four hundred thousand dollars for the first year, and that it must be conducted to the finish by an annual expenditure of at least as much more. The Americans in Paris, the doctors, the surgeons and the dentists (of two of whom I will speak afterwards) and other people, came together to consider this proposition.

An examination was made of the building, and within the forty-eight hours the whole sum was underwritten and a promise given that we should be responsible for the conduct of that hospital. There were to be always not less than twenty thousand dollars in the treasury, and whatever might befall Paris, no American should desert his post. The Americans undertook that and soon had an opportunity to prove their devotion, which I always like to speak of, for there was one moment when no one doubted but that within a few hours the bombardment of Paris would begin and the German army would enter Paris, as we believed, through Neuilly, where the hospital was. I received a telegram from Mr. Gerard, American Ambassador in Berlin, one evening, saying: "The German General Staff advise you and all Americans to leave Paris at once by Rouen and Havre." At that moment the French government had left Paris and some million and a quarter of the people fled within forty-eight hours. That was a test upon all connected with that institution; they had given their pledge, but it seemed under these circumstances that they should not only be permitted, but that some of the people there should be advised to go. They were told that they would be released individually, but not collectively; there were certain ones that were urged to go and could go without discredit. *Not a nurse, doctor, surgeon or dentist, not even an errand boy, ever left his post or thought of leaving it.* I see before me a young man who was in that hospital at the time and knows of this work and what it has accomplished.

It was this institution that inaugurated the ambulance or field service of which we have heard much. Hundreds of our college boys have gone to drive these ambulances. Already they have almost three hundred in operation and will soon have five or six hundred.

The hospital at Neuilly had the honor of inaugurating dental service; the first, I believe, in this war. It also has had the distinction of creating a method of removing, within forty-eight hours, to the Base Hospital, wounded men from the front. The saving of lives and of suffering by that method is beyond comprehension. From Lieut. Pechkoff, who was here recently, we have heard of its service to humanity; he himself was brought back to health there under the care of Dr. Feiss and Miss Grimes, a Cleveland nurse, after his arm had been shot away and gangrene had so developed that he was told he had but a half hour to live.

I have written down some detail which I could not possibly remember of the part which your profession has had in making the American Ambulance one of the great war hospitals. The dental department of that hospital has demonstrated that it is of such wonderful value that no one hereafter ever will think that any war can be conducted and the wounded be cared for except with the necessary contingents of the best scientific men that your profession can produce. Some of the best surgeons, physicians, dentists and nurses of America have given their service in this hospital. In consequence it has been enabled to develop new and improved methods of treatment which have been adopted in other hospitals and constitute a permanent addition to the medical knowledge of the world. No advance of this sort has been notable more than in the field of dental surgery. It is doubtful if there has ever been such quick and general recognition of the essential part that the science of dental surgery bears in relation to general hospital work as has been accorded in this war. Surgeon A. M. Fauntleroy, U.S.N., in his report on the medico-military aspects of the European War, made to the Navy Department, gives a good deal of space to dental surgery. He says that one of the surgical advances of the present war has been the recognition of the dentist as a necessary unit in the organization of a military hospital. So valuable has this work become that every large military hospital now has its surgical dental department which works in conjunction with the other surgical services and supplements certain procedures which are indispensable as regards bringing about a favorable result.

This war has brought about many new conditions. The fact that most of the fighting has been done in the trenches has had the natural result that a large proportion of the wounds were of the face and jaw, involving usually a great loss of substance in the form of bone, teeth and soft parts.

It is not only in surgery connected with the jaws and teeth that dentists have proved their great usefulness in this war. They have done wonderful work in the field of hygiene of the mouth and in preventing infection. In the matter of restoring horribly disfigured men to nearly their normal appearance, the dental and plastic surgeons have achieved results that have attracted the widest attention. It is not possible to exaggerate the relief that has thus been brought to many victims of the war. These unfortunate men come to the hospitals, particularly to the American Ambulance, with faces literally shot away—jaws, mouth, nose gone. Under the old methods, if they recovered at all they would have become such frightful monstrosities that it would have been necessary to keep their faces covered. Children would have run from them in the streets. They could not have resumed their places in society, their occupations would have been gone, and they would have been left outcasts in the world. But the skill of the dental surgeons has changed this. They have literally rebuilt human faces. They have replaced parts that had been shot away and have restored men so that they could take their places in society again and be of use to the world. It is not strange that special hospitals to be devoted to this class of work alone should have been proposed.

It is only proper to say that a great deal of credit for all these achievements belongs and has been accorded freely to the American Ambulance, which has treated a great number of such cases and has supplied the initiative and the leadership for similar work in many other hospitals. The Surgical Dental Department of the American Ambulance is in charge of two American dentists, Dr. G. G. Hayes and Dr. W. S. Davenport. Beginning on a comparatively small scale, the work of this department has gradually extended. There are now ten dental surgeons, besides the dental surgeon in chief, Dr. Hayes, together with many nurses and assistants.

The following report for the year ending August 31, 1916, of the Dental Department of the American Ambulance Hospital, will be of interest to members of the dental profession:

"Since the last report the Dental Department has been considerably extended and now comprises three operating rooms, and a well equipped laboratory. Several special donations have been received for its use, and one, 'The Gold and Platinum Fund,' has permitted the extended use of these precious metals in cases requiring work of the most permanent nature. Another fund has made possible continuous radiographic and photographic records of all interesting cases, and these will be of inestimable value to the profession when published. In addition to these records, sixty-one life masks showing patients in successive stages of operative treatment, have been prepared, and 647 plaster models, showing the maxillæ before and after treatment, together with the apparatus used in the reduction and maintenance of fractured parts.

"In spite of the increase of the number of wounds involving fractures of the maxillæ and the long and special treatment demanded in these cases, it has been the constant effort of the department to offer to every patient in the Ambulance regular dental attention including prophylaxis of the mouth, removal of broken-down teeth, necessary fillings, and the substitution of artificial teeth whenever necessary for mastication or to correct visible deformity.

"The importance of a Dental Department as a necessary unit in a general military hospital has now become widely recognized, as its close association with other branches of surgery can alone permit of its development and usefulness.

"The reputation created by the results of the first year's work, which attracted attention and interest owing to the new problems involved, has been a constant incentive to greater endeavor, and the lead obtained by being the first war hospital prepared to receive and treat cases of severe fractures of the jaws has awakened a most legitimate desire to keep this lead on the part of every member of the staff.

"During the year visits have been received from the heads of nearly all of the French stomatological centers, as well as from special delegations of English, Italian, Russian, Spanish and Servian dentists, and numerous special cases have been received for treatment from Belgium, England and from many French hospitals.

"During the year ending August 31, 1916, 371 cases of fractured maxillæ have been admitted, of which 226 have been discharged cured, 45 remain in the Ambulance and 100 have been transferred to auxiliary hospitals and are still under treatment by the Department. In the more usual dental work may be mentioned 3,593 extractions, 6,150 fillings of all descriptions, 796 plates and appliances fabricated and fitted, and 10,562 general surgical and prophylactic treatments. There was a total of 14,353 sittings and general anesthesia was employed in 92 operations."

It is a fortunate thing for this country now, when war is upon us, that it can profit by the experience of France, England and their allies during the last three years. Preparation has been sadly neglected, but we can in part make up for lack of foresight by adopting the methods which the Allies have found effective. Their methods of surgical and medical treatment should be of especial value to us, for they have mobilized as we must do the expert knowledge and skill of their scientists.

I cannot praise too highly the spirit of co-operation and service in which the Cleveland Dental Society has prepared to aid the nation in the war which is being forced upon us. The country is going to need the service of every man in every walk of life; your anticipation of that need and preparation for it is evidence that the spirit of sacrifice which inspires the French people, which has been uppermost in this country in every national emergency, is still the living and unconquerable force without which all the modern death-dealing equipment of war cannot prevail. It is that spirit of faith, of love of country, of self-subordination, which enables French troops, though inadequately equipped and armed, to arrest and turn the great German armies as they swept on through Belgium, almost to the gates of Paris. It is that same spirit, handed down to us from our forefathers as the greatest of our inheritances, that is now waking in the breasts of Americans, for though at times it may have seemed to slumber, it has never died. The spirit, inspiring and supported by such measures of preparation as you are taking now to be ready when the call comes, is invincible.

There are many things before us that we do not comprehend. I remember the day just before war was actually declared in France; within forty-eight hours the whole face of the world seemed to be changed. We are sitting here tonight and life is normal all about us; I suppose the President of the United States has finished his speech by this time—he was to begin at eight o'clock. The die probably is cast. We are entering upon new conditions in America such as this generation has not known; conditions which I trust that when this war is finished, never again will be permitted. Within a short time millions and millions of American people will be transformed in spirit, taken away from the activities of normal life and its common aspirations, to fulfil that duty of national defense which is the first and highest obligation of citizenship.

I have no doubt that America will comprehend the meaning of this war. It is the supreme struggle, to determine whether government of the people and by the people should or should not perish from the earth. I believe that the men of this generation will justify to the full the traditions and the expectations of this beloved country of ours, and that we shall uphold to the finish the honor of this flag (raising an American flag), and it will rise higher than it has ever been before as a token for the whole world.

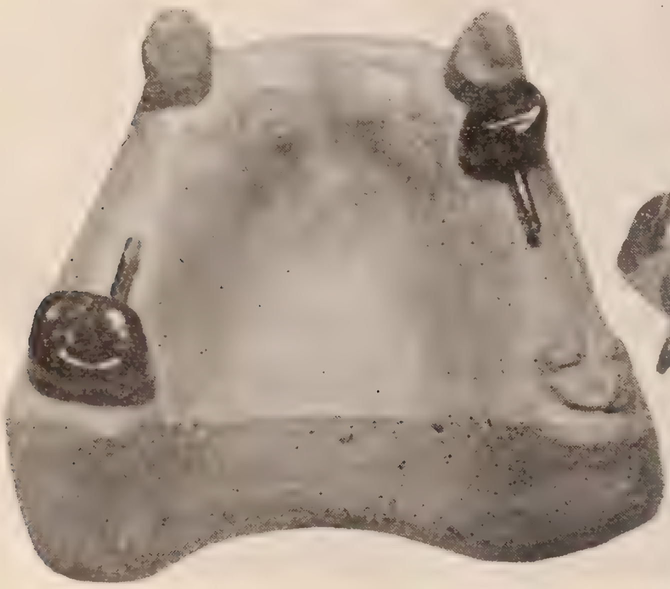
Constipation

In an article in the *Medical Record* it is stated that daily bowel actions are imperative, and this must be largely brought about with a ration of coarse-grained food in conjunction with exercise and abdominal massage. Avoid cathartics as far as possible; if laxatives are required, high-grade mineral oils hold the preference.

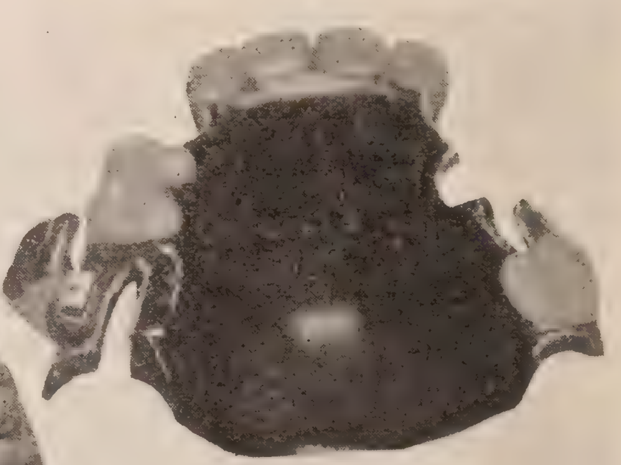
PARTIAL DENTURE*

BY DR. MORRIS GREENBAUM, CINCINNATI, OHIO

THIS CLINIC is for the purpose of showing improved methods of employing Gilmore or other attachments. The principal objections to these are that dentures will not settle without either breaking the attachment from the plate or loosening the abutment, with eventual loss of tooth. The principle of the Roach attachment seems to be the better,

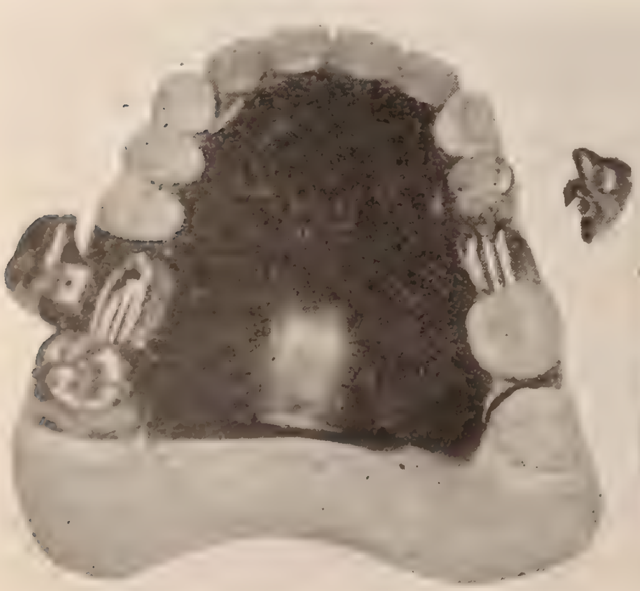


Model No. 1

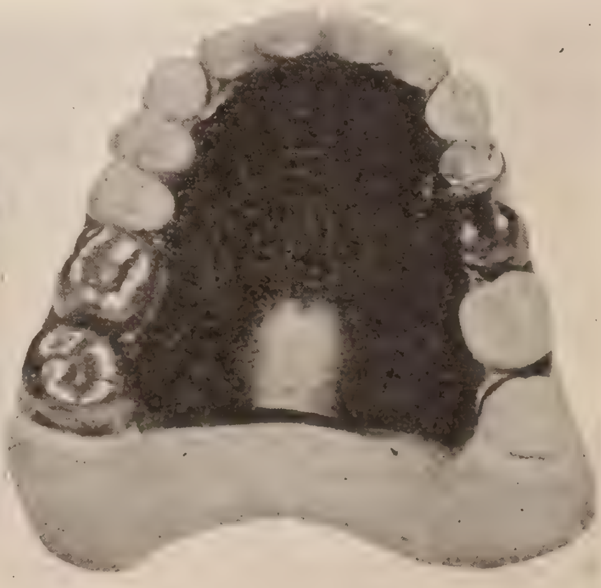


Model No 2

Model No. 1—Gilmore bars in place.
Model No. 2—Plate formed to go to position without touching bars.



Model No. 3



Model No. 4

Model No. 3—Plate in position, with Gilmore attachment soldered in gold dummies.
Model No. 4—Completed case.

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*Clinic at Ohio State Dental Society, Dec., 1916.

more especially with Dr. Cummer's spur attached to prevent plate from tilting at least to a great extent.

The following models are a combination of the Bischof-Otrich and Gilmore ideas. Through placing the attachment in the plate too much pressure is brought on the small Gilmore clasp and, as above stated, the result may be that either the clasp or the bar breaks or the tooth becomes so loose that it will be of no further service; perhaps some day the patient may even bring the plate, teeth and all, to you in his hand.

Place the attachment in a dummy next to an abutment and allow it to receive the stress of mastication. Little retention is needed to keep the denture in position.

The attachment can be employed with Steele, porcelain, gold-backed teeth or gold dummies. If desired, to avoid possible loss of dummy with attachment, solder a round gold wire at neck of same, vulcanize in the plate and when finished move dummy slightly and a hinge effect is produced. About as much pressure is brought on the abutment as in a two-tooth bridge.

AN EASY METHOD OF MAKING A BICUSPID RICHMOND CROWN*

BY OSCAR MIESSE, D.D.S., COLUMBUS, OHIO

IN MAKING this bicuspid Richmond crown, the root preparation is the same as for any Richmond crown. You take the gingival measurement and adapt a gold band to the root, then solder flat plate of gold to gold band.. Prepare root or roots for post and solder post or posts to gold plate foundation.

Take bite and impression; articulate, and then you are ready for the selection of tooth. Purchase a pinless bicuspid porcelain crown of size (as per model) and length (as per bite) of any standard manufacture. Adapt porcelain crown to flat gold preparation at gingival, and to perfect occlusion. Then take post that comes with porcelain crown and cut away that portion intended for the root, and retain that small stub which fits in porcelain crown. Grind this stub while in place in porcelain crown so it is just level with the base. Place just a speck of beeswax on the center of gold base; then adapt porcelain crown containing this stub of the pin to the gold base, using slight pressure. Withdraw porcelain crown, leaving post-pin adhering upright to gold band by means of the beeswax.

At this point remove band and dowel from plaster cast. Make a hole in charcoal soldering block large enough to take the post, insert post in this hole and bring the plate of gold so that band rests on the soldering block. The stub of pin, which is resting on plate of gold by means of beeswax, can be held in place by a pair of spring tweezers, one point of which is inserted in the side of the charcoal soldering block, the other point resting upon the top of the pin. Solder pin to gold plate base with any low karat solder without investing. Cement porcelain crown on this post and polish gold band.

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*Given as a clinic at Ohio State Dental Society, December, 1916.

THE USE OF THE X-RAY IN DENTISTRY*

BY GEORGE F. THOMAS, M.D., CLEVELAND, OHIO

THERE IS PROBABLY no subject in the whole field of Roentgenology that is so full of interest to all the various specialties ot medicine and surgery as that concerning the use of the X-rays in dentistry. This interest is justified by the frequency with which pathological conditions of the teeth and their adnexa are established as etiological factors of constitutional conditions or secondary lesions localized almost anywhere else in the entire body.

A list of these secondary effects includes obscure fevers, gastro-intestinal disturbances, pains referred to the back of the head or neck, neuritis, myositis, hypertrophic arthritis, inflammatory lesions of the eye, endocarditis, and abnormal mental conditions such as melancholia, irritability, insomnia and neurasthenia. In the presence of any one of these conditions, an investigation of the teeth is indicated, and this means an X-ray examination, which is the only way of detecting some of the obscure dental lesions, such as painless alveolar abscesses or unerupted impacted teeth.

As can be seen from the diversity of the diseases above mentioned, practically all the branches of medicine are affected, and they are accordingly all interested in the use of the X-ray in dentistry.

Furthermore is indicated the necessity of broad co-operation between the Roentgenologist, the dentist, and all the other specialists. Because of this co-operation in the past fifteen or sixteen years, an epochal advance in the science of medicine has been recorded. Even greater possibilities in the field of preventive medicine are indicated for the future.

The need of this co-operation cannot be overstated. In the first place, the dental conditions that cause the more serious secondary disturbances are not as a rule associated with the important local subjective symptom of pain. If they were, the patient would immediately seek the attention of the dentist and treatment would be instituted before other harm resulted. As a matter of fact, at the present time, many of these painless dental lesions are discovered in the course of routine Roentgen examination made at the instance of the internist, neurologist, orthopedist, optholmologist or other specialist, to whom the patient appealed because of the symptoms arising from the secondary lesion.

It is in this situation that an opportunity is afforded the Roentgenologist to be of mutual service to the patient, the dentist and the other specialists concerned. I refer to the broad interpretation of the X-ray findings which, if based on a familiarity with the problems of the dentist, will often prevent ill feelings on the part of the patient or too radical recommendations for treatment on the part of the extra-oral specialist; or on the other hand, guided by broad experience in the observation of similar cases from both the medical and dental view-points, will suggest the necessity of efficient yet conservative dental treatment.

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*Read before the Cleveland Dental Society, January 8, 1917.

This assumes that in these cases the chief functions of the Roentgenologist are those of a consultant. He should be conversant with all the problems of diagnosis of all the various specialties insofar as Roentgen examinations may be of service. His skill in interpretation should not be limited to one field, but should enable him to recognize conditions which might suggest the need of further investigations, possibly outside the specialty of the one who referred the case. In other words, because of frequent experience with all sorts of cases, and because of unequaled opportunities for discovering unsuspected underlying etiological factors, the Roentgen laboratory may well serve as a diagnostic clearing house, suggesting to which specialist a case should be referred for treatment, and encouraging co-operation between those specialists.

When we consider that painless abscesses may be found at the roots of apparently sound teeth, that unsuspected unerupted and impacted supernumerary teeth are not infrequently found, then we can realize that the arguments of some of the writers in our recent medical and dental journals against the X-ray examination of apparently sound jaws are not well founded. Any statements to the contrary notwithstanding, the only way to eliminate the presence of a possible source of irritation or infection about the jaws or teeth is by a careful examination by both the dentist and the Roentgenologist. That the dental profession is keenly alive to the value of X-ray examinations of the teeth not only for the purpose of diagnosis, but also to check up the results of treatment, is a promise of progress along the lines of preventive medicine. The existence of obscure dental lesions will be discovered before secondary conditions develop; apical abscesses will be given full opportunity to fill in with healthy tissue before the permanent root-canal fillings are sealed in; the canal fillings in turn will be checked up; the condition of the roots and the alveolar processes will be thoroughly investigated before permanent bridges are put in place; in short, all the information possible about a given case will be obtained before the patient is discharged with the statement that everything from a dental standpoint is in good condition. In the final analysis, accuracy in diagnosis is essential to efficient treatment, and one of the greatest aids to accuracy in diagnosis is competent Roentgenology.

Before considering the question of interpretation of dental Roentgenograms, a few points regarding their making might be of interest. In the first place, the operator must have proper training and an adequate equipment. The danger of X-ray burns is still with us. Small outfits in the hands of the inexperienced add to the danger. Furthermore, they lessen the accuracy of detail and correspondingly the possibilities of interpretation.

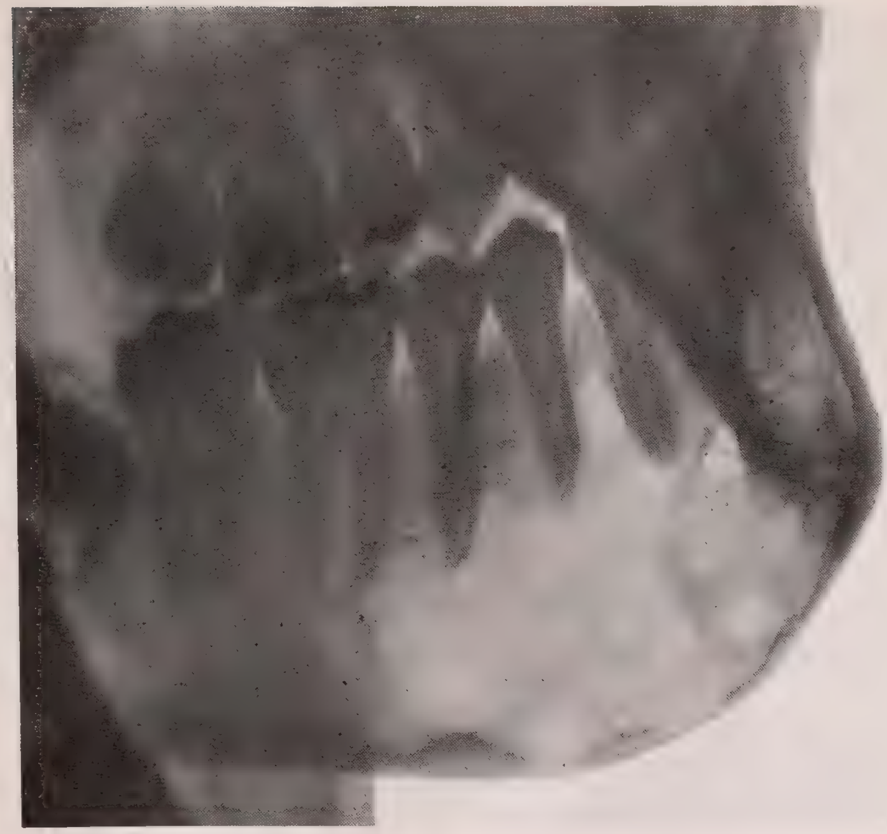
In regard to technic, it must be assumed that the operator is sufficiently acquainted with the primary principles of Roentgenography to use a ray of proper penetration, and to insure that the film, patient and tube are relatively at rest during the exposure. The latter condition may be attained by the use of supports if necessary and by having the patient stop breathing for the time of the exposure. Patients can usually hold a film in the mouth steadier with their own fingers than with artificial holders. If the patient will bite gently on the finger, the muscles in the floor of the mouth automatically relax, and there will accordingly be less tendency for movement of the film. Furthermore, the film can be placed lower and in better position for the lower teeth.

The above precautions, together with the use of a finely focused tube and a small bore cylindrical diaphragm, will insure the production of films with fine detail.

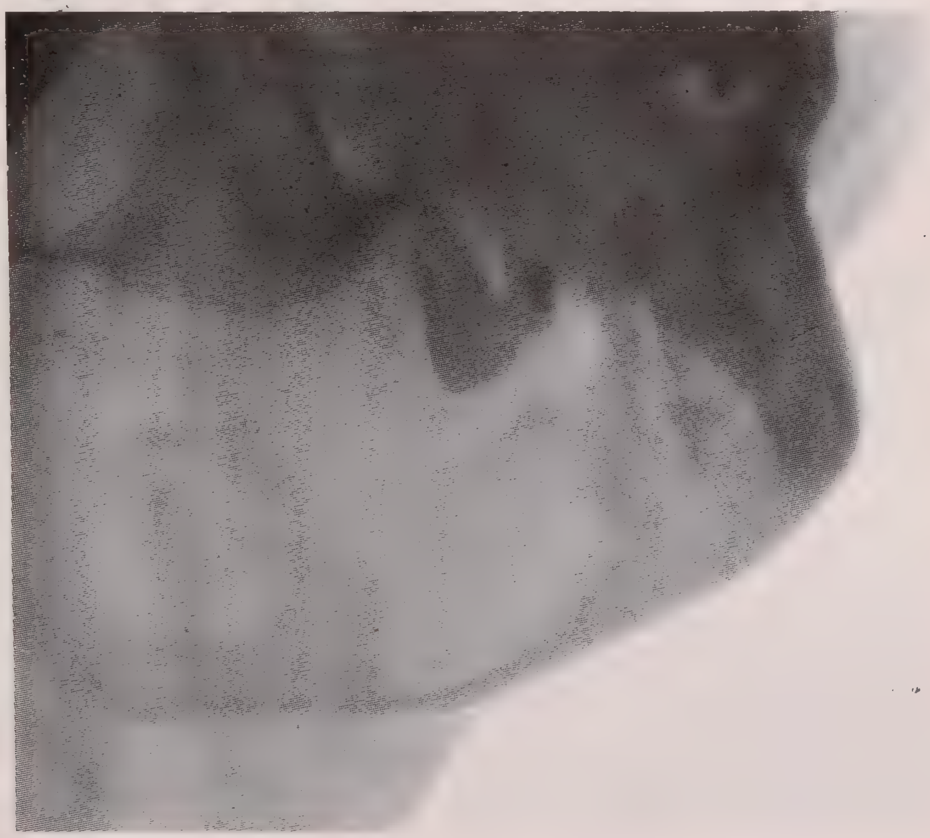
As a rule, the exposure should be made at such an angle as to minimize distortion. This eliminates to a certain extent one of the difficulties of interpretation. The desired angle is one at which the central ray is at right angles to a plane midway between the plane of the film and that of the object under examination. This condition indicates the desirability of small films for accurate work. About five different angles are required for each jaw for adequate structural detail and reasonable elimination of distortion. The films are placed inside the mouth at the desired location, and the tube is adjusted to suit the individual requirement of the case.

For less accurate detail, but a more comprehensive survey, exposures may be made on two 5 x 7 or larger plates, each showing practically one entire side of the upper and lower jaws, except possibly the upper incisor region, which can be separately examined by the small film method. When there is a question about the position, or presence of unerupted teeth, this plate method is especially valuable. For this kind of examination the patient's cheek rests on the plate, and the patient and tube are so adjusted that the rays penetrating the desired area pass below the body of the opposite jaw, the shadow of which is projected upward and forward in reference to the region desired. The examination of a film should be made with a diffuse white light of not too great intensity. The light from the northern sky, which most dentists insist upon for their ordinary work, fulfills these requirements. The customary electric bulb does not. Furthermore, the translucent celluloid film-holder customarily used, interferes seriously with the study of fine detail. They are of course of value to those who make a practice of examining films by the light of an unfrosted electric bulb. They also are convenient for records and filing.

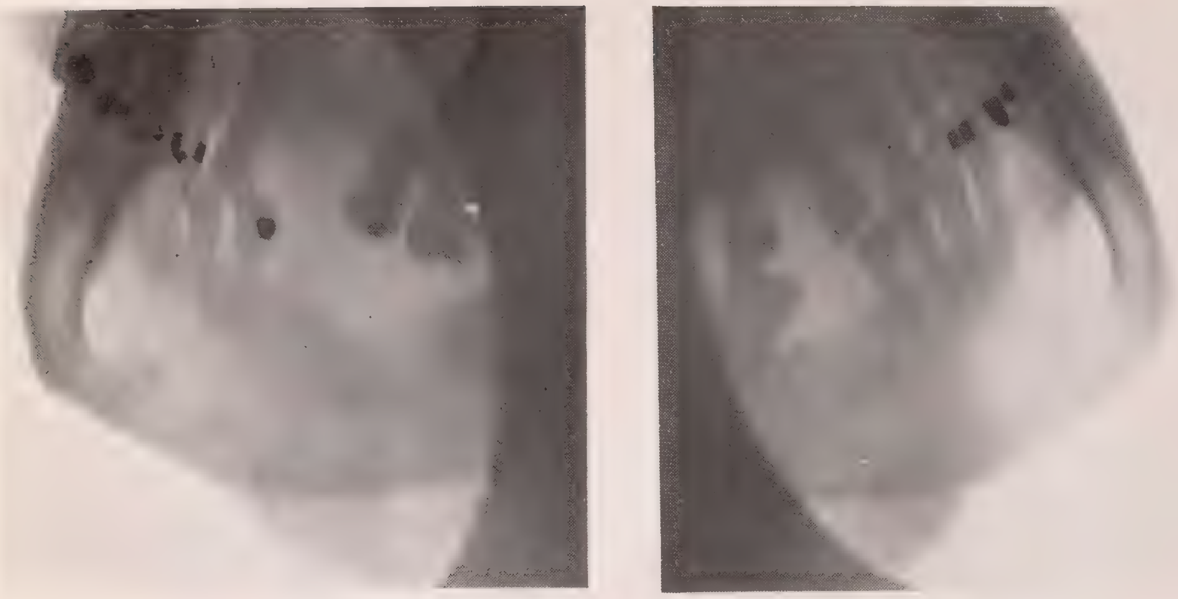
The interpretation of dental Roentgenograms requires a knowledge of the fundamental physics of Roentgenography as well as a familiarity with



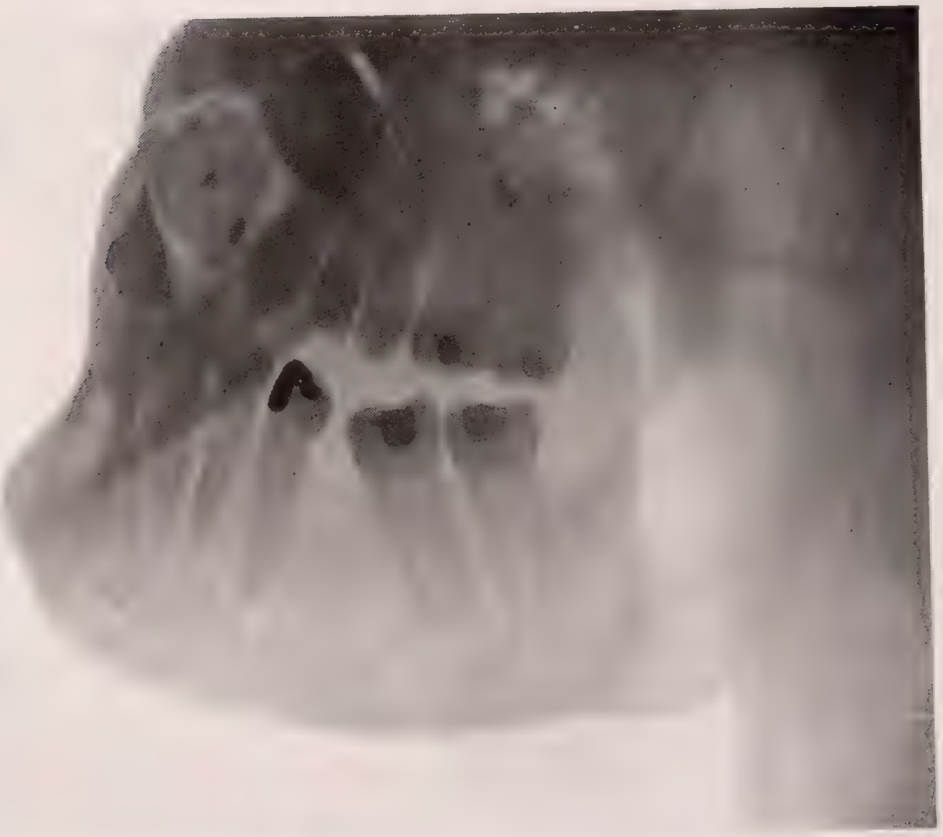
No. 1. Cyst of body of inferior maxilla



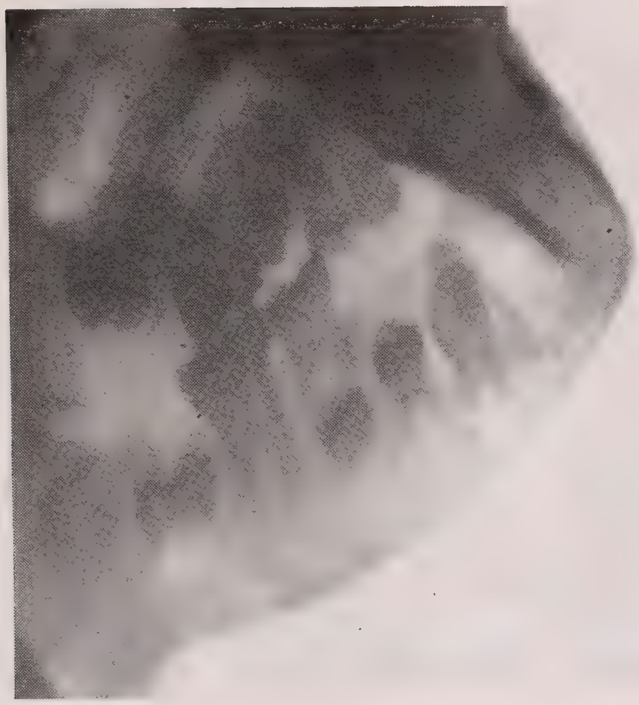
No. 2. Large cysts of inferior maxilla



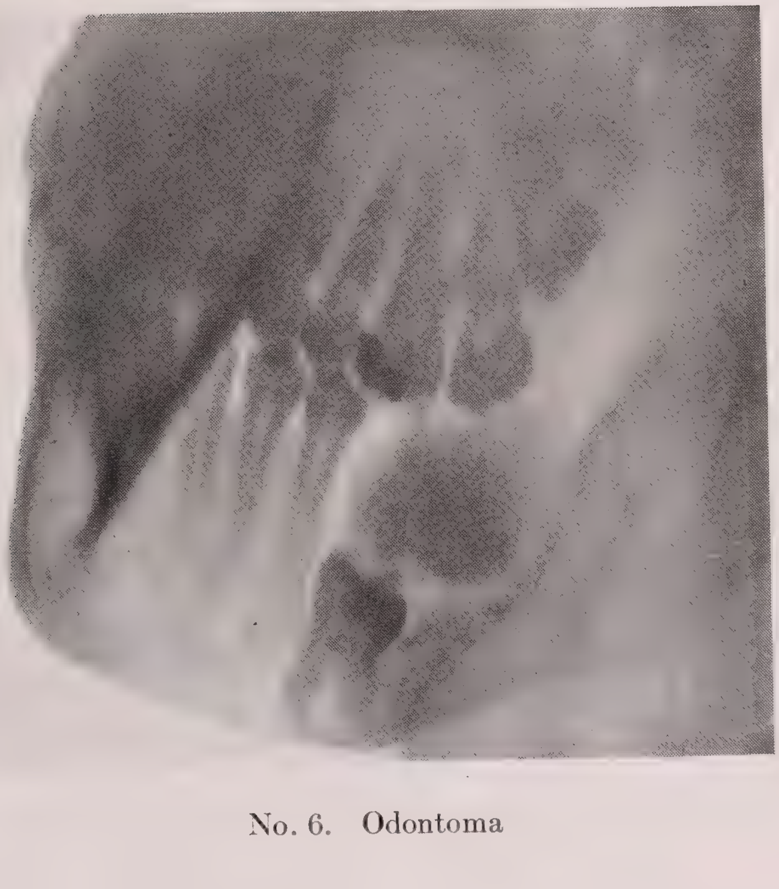
No. 3. Large cyst involving both sides of inferior maxilla



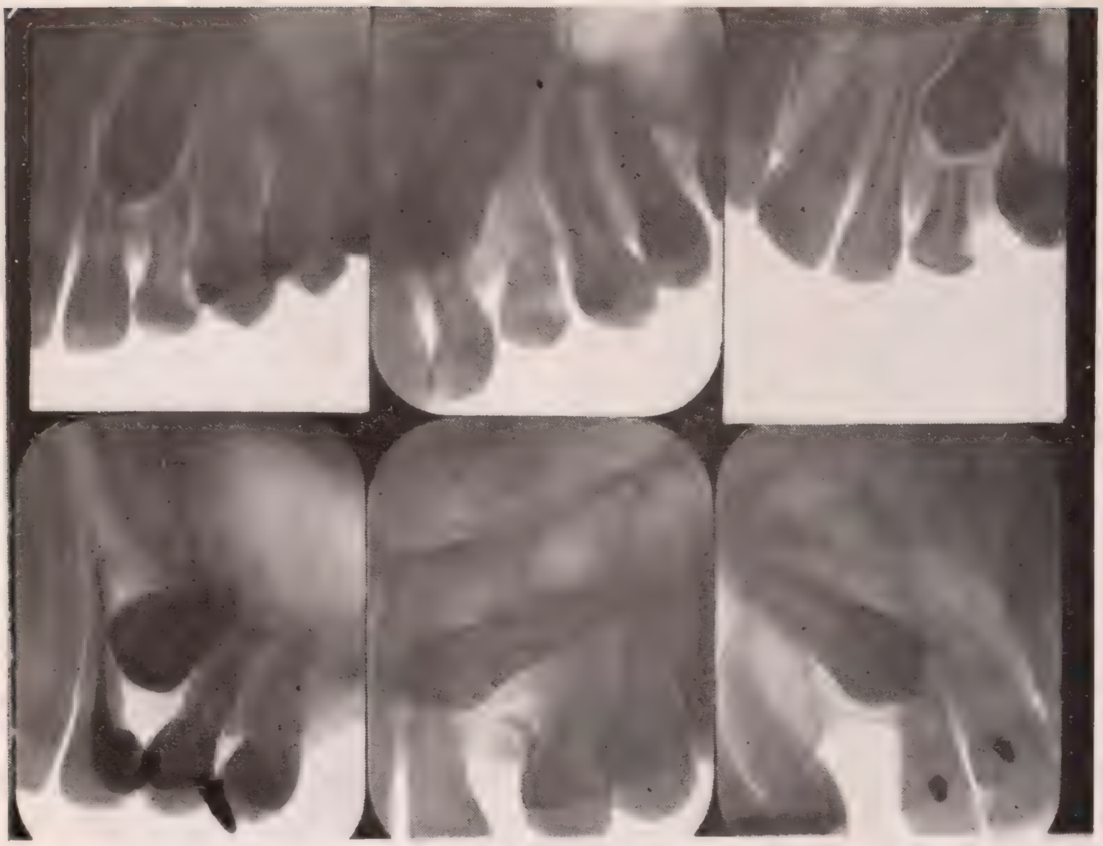
No. 4. Cyst in ramus of inferior maxilla



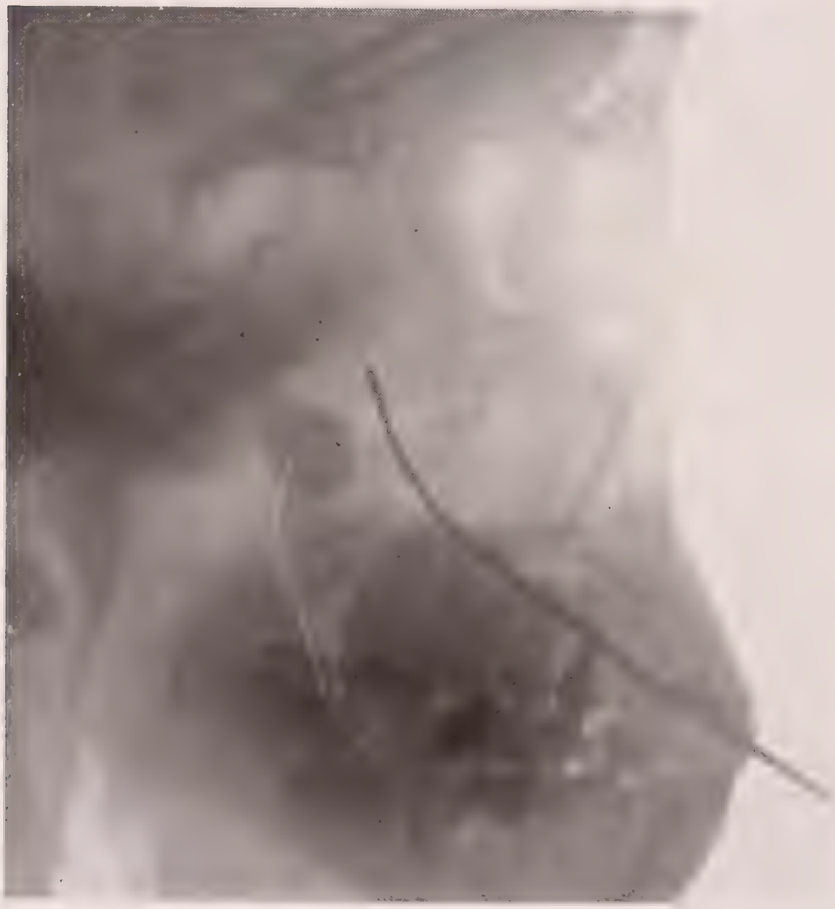
No. 5. Dentigerous cyst in cuspid region of inferior maxilla



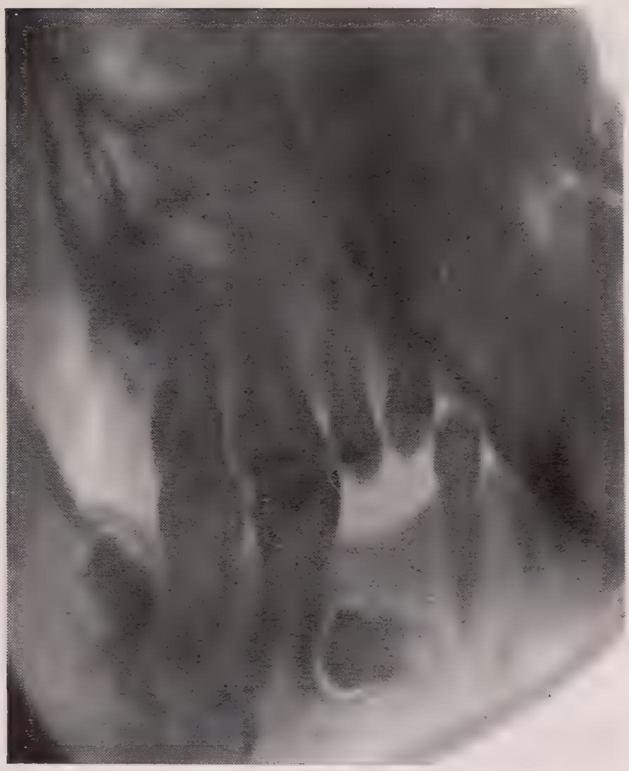
No. 6. Odontoma



No. 7. Unerupted teeth

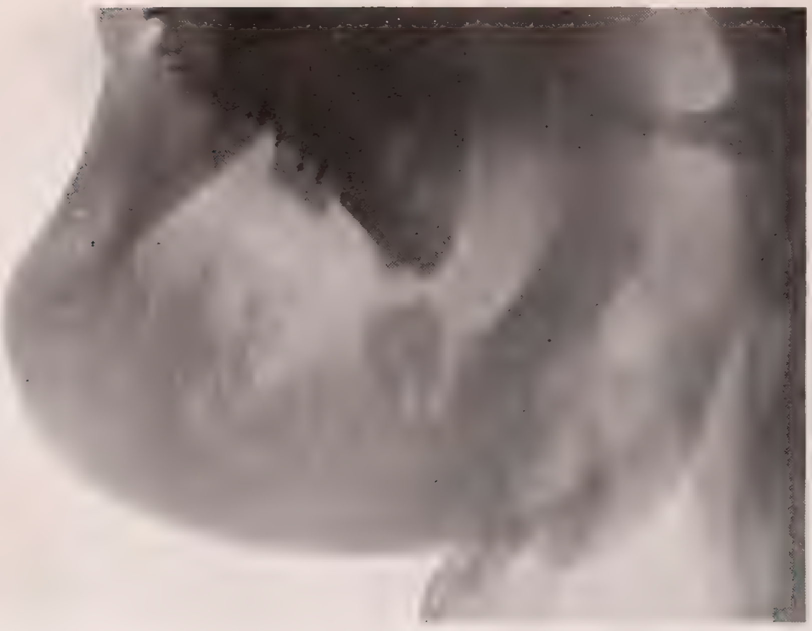


No. 8. Unerupted molar in posterior wall of antrum

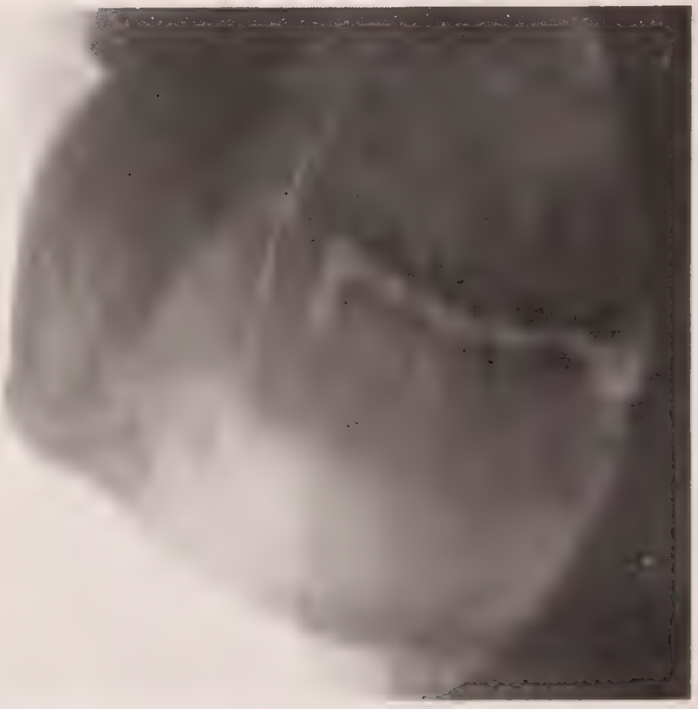


No. 9. Impacted lower bicuspid

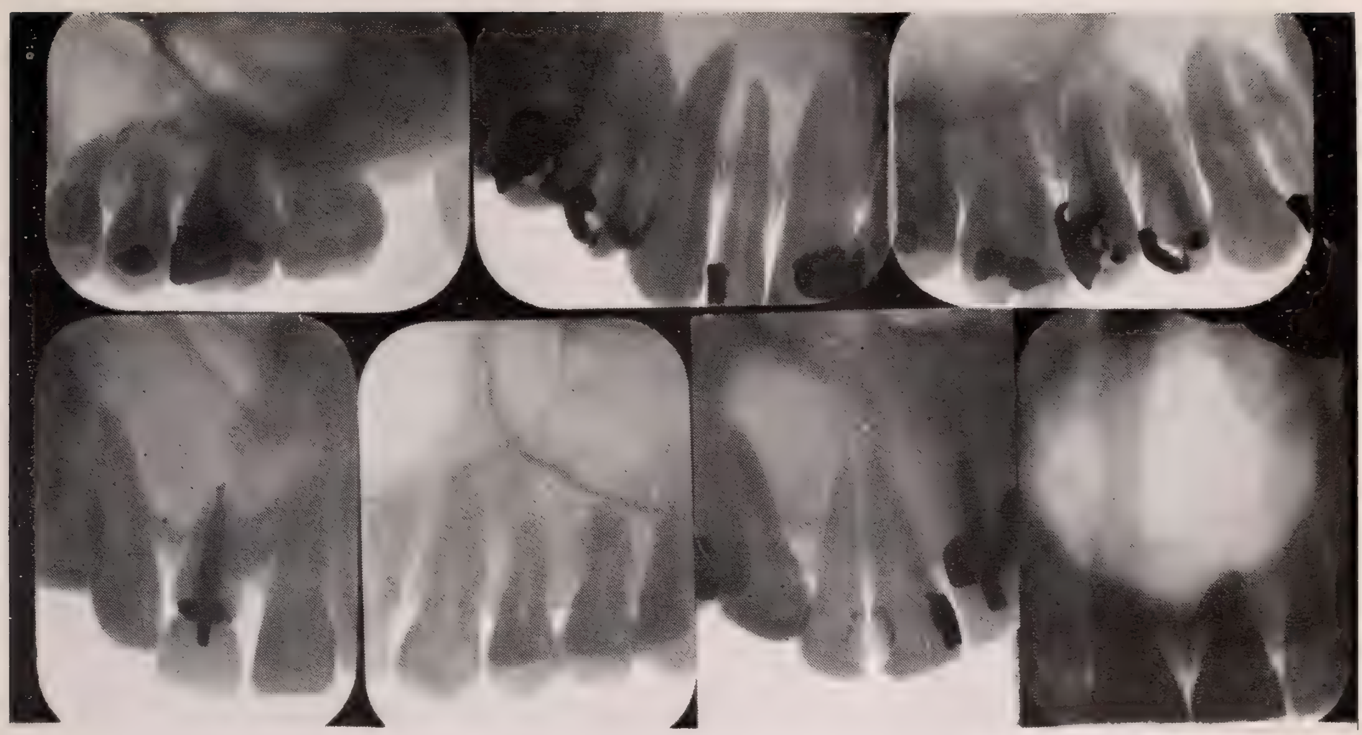
No. 10. Osteomyelitis of inferior maxilla



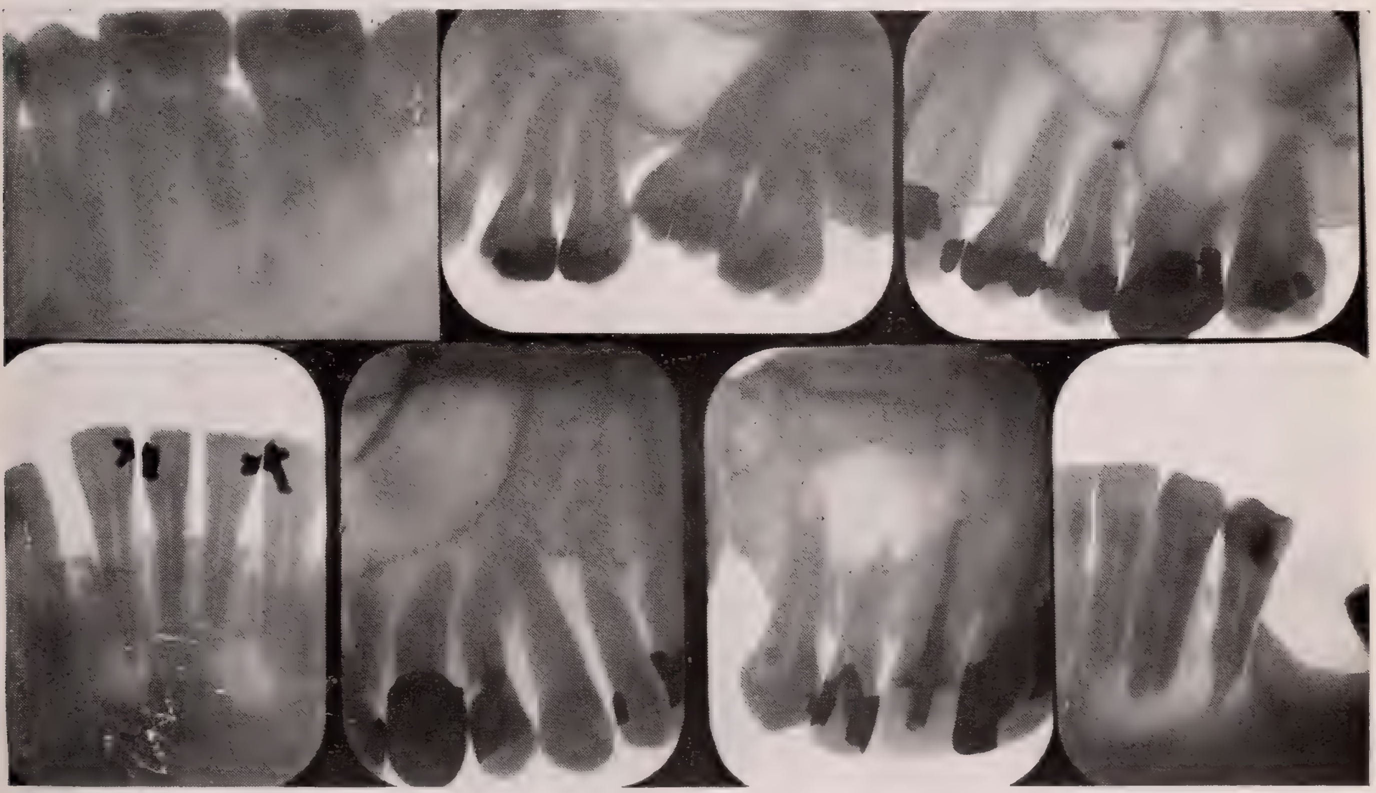
No. 11. Osteomyelitis arising from old broken-off roots, which had been buried by the gum and remained quiescent for many years



No. 12. Sarcoma of inferior maxilla



No. 13. Cysts in upper jaw. Note difference in appearance of cyst wall from wall of antrum



Dentigerous cyst from unerupted third molar

Angulation of molar against bicsupid

Normal apical shadow showing through antral shadow

Abscesses

Pyorrhoeal Absorption

Cyst from old abscess

Old abscess with absorption of apex

No. 14

the shadows of normal and abnormal tissues. The film merely records the comparative resistance that the various structures present to the transmission of the rays. If very penetrating rays are used, the entire film may be blackened except for the shadows of metallic fillings. But if rays of proper penetration are selected, there will be definite contrast between the shadows of the various structures. The tooth itself, though the most opaque tissue in the body, varies in density enough to show the enamel, the dentin, the pulp cavity and the root canals. Surrounding the roots there is a thin dark line corresponding to the pericemental membrane. This in turn is in definite contrast with a thin white line-like shadow produced by the compact bony lining of the alveolus, the so-called lamina dura. When normal, the alveolar side of this line is smooth. The more cancellous bone of the jaw is less dense, of course, than this cortical layer, and its honeycombed structure shows up quite clearly in a good film. Its density is quite uniform. Any definite variation either in detail or density must be noted and interpreted.

An infectious process in bone results in absorption of the lime salts. This is indicated on a Roentgenogram by an abnormally dark area when contrasted with the normal. In a dento-alveolar abscess, this process is first indicated by a disappearance of the white alveolar rim at the apex of the root, and a dark area extending into the cancellous bone tissue. This appearance does not occur immediately at the time of the inception of the abscess, but only after time has been allowed for the process of decalcification to take place. This time is not definite. It probably varies with the nature of the infection. In the same way that an osteomyelitis of the other bones of the body may not be recognizable on an X-ray plate immediately after the primary symptoms of an infection are present, so there may be a short interval after pain indicates the formation of an alveolar abscess before the Roentgenogram will show abnormal conditions at the apex. As the condition progresses the cancellated appearance of the bone structure disappears. The root itself may also be more or less absorbed. If a fistula forms through the external alveolar plate, the shadow will be quite black. If the discharge takes place along the sides of the root, the white line of the alveolus will be absorbed (that is, there will be a broadened dark space alongside the root), and quite a marked destruction of the alveolar process may take place.

The healing of an infectious process in bone is accompanied by a formation of new bone tissue and a redeposit of lime salts. This recalcification may restore the bone to almost normal appearance, or it may be excessive and make the bone denser than normal. In the same way the root may be enlarged or become ankylosed by being made continuous with the bone structure, the pericemental membrane being absorbed.

By careful observation, therefore, it is oftentimes possible to draw quite accurate deductions from the Roentgen shadows such as to whether or not the involvement is of long standing, whether the abscess is active, or to conclude that previous inflammatory changes had taken place and healed. Such data regarding the pathological history of a tooth may be of great value to the dentist.

Occasionally it may appear that a different process of resolution of a dento-alveolar abscess may take place. Instead of filling in with new bone, there may be a walling off of the abscess and the formation of a sterile cyst about the apex of the root. This cyst then may be surrounded with a smooth white border, which demarcates it sharply from the surrounding cancellous bone. This line is somewhat similar to but less dense than the white border of the antral shadow.

This characteristic, when present, will help in the differential diagnosis between cysts, sarcomata and bone abscesses. Unfortunately, it is not always possible to make out this faint white line, but nevertheless the demarcation is more abrupt than in an active abscess, or a sarcoma.

In a similar way, if an ordinary cyst becomes infected, the wall undergoes absorption, and the gradation in density from the cyst to the healthy bone is more gradual and irregular, as in a primary bone abscess. Dentigerous cysts are diagnosed by the presence of an unerupted tooth in connection with the cyst. Other types of cysts may occur in the jaw. They may be either single or multiple. Almost the entire jaw may be absorbed except for a thin cortical shell. The diameters of the bone may be markedly increased without the continuity of the shell being broken, unless by trauma. This fact helps to differentiate from malignancy where there is a tendency for the tumor to break through the cortex and involve the soft tissues at a relatively early stage.

Osteomyelitis of the jaw presents a varied picture according to the nature and extent of the disease. In the more advanced cases, the areas of bone destruction are shown, with other areas of density greater than normal due to reactionary processes. The cortex may be thickened, due to periosteal proliferation. The original bone tissue may be shown as a sequestrum surrounded by an involucrum of new bone. From this advanced type, the appearances range downward to that of a simple alveolar abscess.

Many errors of interpretation of dental films have resulted from a lack of knowledge of normal anatomy. The mental foramen located beneath the lower bicuspid region, and the anterior palatine foramina above the central incisors, have been diagnosed as abscesses. Divisions of the antra have been called cysts or abscesses, and much stress has been laid upon the apparent penetration of the roots of the upper molars or bicuspids into the antrum, an appearance produced by the superimposition of shadows. Careful observation, furthermore, would reveal the presence of the white alveolar line about the roots, lying within the antral shadow. The antrum can be differentiated from an abscess by its smooth white border.

The diagnosis of empyema of the antrum of Highmore is not as a rule possible from a film. In order to get sufficient data for this purpose, it is necessary to make an antero-posterior plate through the head showing the comparative density of both antra. Where it is advisable to determine the relation of an antral infection to a possible alveolar abscess, films over the appropriate area must also be made.

There are many other important facts to be obtained by a careful inspection of a good dental Roentgenogram, which may be of value in the diagnosis and treatment of a given case. Such data concern the existence of a possible fracture of a tooth; the presence and extent of pyorrheal absorption; the deposit of calculus about the neck or root of a tooth; exostosis of the root; the presence of unsuspected cavities of the teeth out of reach of ordinary inspection; or invisible extension of caries beneath a filling; the possible presence of pulp nodules; the shape, length and position of the roots; the possible presence of abnormal roots; and furthermore, the number and position of the root canals; possibly the abnormal presence of a double root canal. It is unnecessary to mention the radiographic appearance of these conditions, the names of which are descriptive *per se*, but it is advisable to recall the fact that many of them may not show up in a single film of a given tooth on account of the direction of the exposure. In so far as possible, the examination should be made in co-operation with the dentist in charge of the case, and with full understanding of the nature of the information he is desirous of obtaining. Films from slightly different angles are often very valuable, and should be made whenever practicable, and always when any of the above conditions are suspected. Though with some difficulty, satisfactory stereoscopic films may be obtained; oftentimes stereoscopic views on plates, which are easier to make, may be sufficient.

There are many other functions of usefulness for the X-ray in dentistry, such as in the recognition and treatment of fractures of the jaw, and in the recognition of foreign bodies, but there is one special application to which I have already referred that is important enough to go into more thoroughly. I refer to the final Roentgen record showing the condition of the roots and fillings before the patient is discharged from treatment. Such a record may be very valuable from other standpoints than that of science, which of itself would be greatly benefited. Occasions may arise when one's forbearance is tested to the utmost by the statements of unkindly or inconsiderate brother practitioners of medicine or dentistry, who attempt to pass opinions regarding previous work done by others. A Roentgenographic record would be one of the surest ways of proving whether or not such criticisms are justified. The development of pathological conditions may be shown to have arisen subsequent to the time of the work under question. Such records would anticipate criticism, establish confidence and promote harmony.

513 Osborn Building.

DISCUSSION

Question: Have you a film or plate showing an infected antrum due to an abscess on a tooth?

Answer: You cannot make a diagnosis of an infected antrum on a film, but I showed a plate of an infected antrum and I also showed a film showing an abscess about a tooth which gave rise to an infected antrum.

Question: What makes the variance in the pictures in density?

Answer: The thickness of the bone wall, the quality of the rays, hard or soft; whether the antrum is large or small, etc. The only way you can tell the meaning of the density is by having a plate showing the size of the antrum and basing your standard upon a comparison with the normal side.

Question: Without a previous history of the case, is it possible to tell whether the tissue is in process of repair or destruction? Absorption of the bone around the apex of the root. Are there any real definite indications that could lead us to believe that the case is doing as well as it can and only wait until nature repairs the bone? Or, do you need past history?

Answer: This is hard to answer in full, there are so many possibilities there. When healing is taking place you can usually see in the surrounding bone tissue denser areas showing that the abscess has been there long enough for nature to try to heal that area by the re-deposit of lime salts. Increasing density about an area of absorption indicates that repair is going on. If you find new bone tissue showing up inside of the abscessed area, nature is taking care of that pretty well. In a case where the thing is still active, you have your area of absorption which is not sharply demarcated, it sort of gradually changes from the dark to the normal shade and would indicate it is more recently developed.

Question: Explain the difference in the shadow caused by a healthy condition.

Answer: The X-ray plate simply shows relative density and the density of thickened mucous membrane may be the same as that of pus and it may be impossible to tell from the X-ray which the shadow on the plate indicates.

Question: You had it in your paper that there was still some danger in the use of the X-ray. Just what is the limit of exposure and what machine would be more apt to lead to a burn?

Answer: The limit of exposure depends entirely upon the quality and amount of ray that you use. The ray that is real hard goes through the skin without destroying the skin very much, whereas the soft ray will burn the skin without producing much of a picture. The make of machine is of no importance except that it must be large enough to produce a sufficient quantity of rays in a tube with a sufficiently high vacuum.

Question: What do you mean by hard and soft?

Answer: A hard ray is one of high penetration and a soft ray is one of low penetration. Dr. Acker referred to an exposure of a couple of minutes and Dr. Thomas answered that exposures varied from a fraction of a second up to possibly ten seconds. For a tooth, three or four seconds, possibly five. Depends on what kind of tube you are using.

Question: Dr. Roseneau claimed that the difference between an X-ray with a very definite outline and those without a definite outline was due to the type of infection; that the definite outline was because the infection was of a virulent type, while if it was a low grade infection the area would be rarefied without definite outline.

Answer: The sharpness of outline of an abscess probably does bear some relation to the virulence of the infection, but there are other factors of importance which must also be considered, such as the length of time the abscess has existed and also the amount of reaction of the tissues to the presence of infection.

Question: Would you ever know when infection was entirely destroyed?

Answer: If there is a re-formation of the bone structure and a re-deposit of lime salts in the site of the original abscess, you may be sure that for all practical purposes the infectious process is entirely destroyed.

Question: Would you consider that white line an indication that nature had succeeded in walling off that infection?

Answer: I would never stand pat on a thing of that kind unless the area of infection was entirely eradicated.

Question: Is there any way of determining the exact length and width of a root canal?

Answer: Insert a wire of definite length inside of the tooth; you can tell by comparative measurements.

Question: The X-ray has been a great help and I have always tried to use it. In getting a picture of both sides in antrum trouble is it not true that if you have considerable edema or swelling of the part, caused by an abscess at the end of a tooth, that you may get a clouding in the picture, which would mislead you in your diagnosis of the case?

Answer: You have to make allowance for that in your interpretation.

Question: In view of the fact that we know of so many systemic diseases that may come and do come from pulpless teeth, is it our duty as dentists to ascertain the condition of those teeth by means of the X-ray and if we find that there is any fault, notwithstanding the fact that there are no systemic troubles, is it our duty as dentists to go into those teeth to prevent future trouble?

Answer: I think he knows the answer himself. I think that if a dentist finds any condition about the jaws or teeth that serve as a source of danger to a patient's health, it certainly should be taken care of as soon as possible. If necessary, he should pull the teeth out. If there are indications of dead teeth not being properly filled, indicating there may be an abscess at the end of it, it should be taken care of whether the patient has developed any trouble at that time or not. The point is, it is a great progress in the treatment if you prevent their occurrence. You will anticipate the extension of that abscess from there into the jaws or into the heart or wherever it may possibly develop. If I do happen to find trouble with a tooth during the course of examination, I certainly always advise a patient to have it taken care of right away.

Question: I wonder whether or not, in the present status of affairs, we are not likely to go to extremes in the removal of teeth in misinterpretation of the shadows thrown by the rays? It strikes me, as far as dentistry is concerned, the radiogram is entirely too new and uncertain; many times the interpretation is not borne out by actual clinical experience. I am inclined to think we are overdoing things and some of us are condemning too many teeth. Should we not go a little bit slowly?

Answer: I have tried in my paper to accentuate co-operation between dentists and other men. I think it is very important that there should be the best opinion obtainable from both the standpoint of the X-ray as well as that of the dentist. If that opinion would indicate there is an abscess around the tooth, why then it is a question of the patient's health or saving the tooth; the teeth can be replaced, the health cannot. Save the health. That calls for the best opinion of a good dentist along with a competent interpretation of a good film. Nevertheless, a good film is a comparatively correct indication of what is going on inside of the jaw. I do not believe you will go wrong very often by depending on the interpretation of it. As a rule you will find the changes shown in the film are absolutely correct indications of what is going on. The interpretation, of course, can lie. The film cannot lie.

DR. STEPHAN: I do not want to draw this discussion to a close, but it seems to me we have had a splendid explanation of the X-ray. I think it is not so new, being perhaps eighteen years old and in our profession one of the most useful things, and has helped us on the road to better dentistry. It has shown us how to take care of things. I move that we extend to Dr. Thomas our heartiest vote of thanks for what he has brought to us this evening.

Motion seconded and carried. Dr. Thomas, you have heard the expression of thanks.

Aseptic Amalgam

Why fill an aseptic cavity with septic amalgam? If you must knead the amalgam after the mortar mix, do not do it by using the palm of one hand and a finger of the other. That is, to say the least, a very bad habit. Procure a good, large finger stall, sterilize the same, and use it by placing the amalgam mix in it and knead it to your heart's content. It will thus remain uncontaminated by anything that may be on the operator's hands. This also makes the right kind of an impression upon the patient.

—*F. W. Frahm, Pacific Dental Gazette.*

SHOWING PATIENT WITHOUT MANDIBLE*

BY C. C. SCOTT, D.D.S., DAYTON, OHIO

THIS is an unusual and interesting case. The patient seemed to be a healthy and robust boy when he was born. At the age of five months he had a sick spell, and they thought he had pneumonia. After the doctor had prescribed medicine for a few days, he found that the lower jaw was badly swollen; in fact, it lay clear down on the neck when the child was lying down. The doctor ordered them to quit giving him the medicine, but the boy became afflicted with an eruption in the left ear which lasted for several years. At the age of five they discovered that the lower teeth were

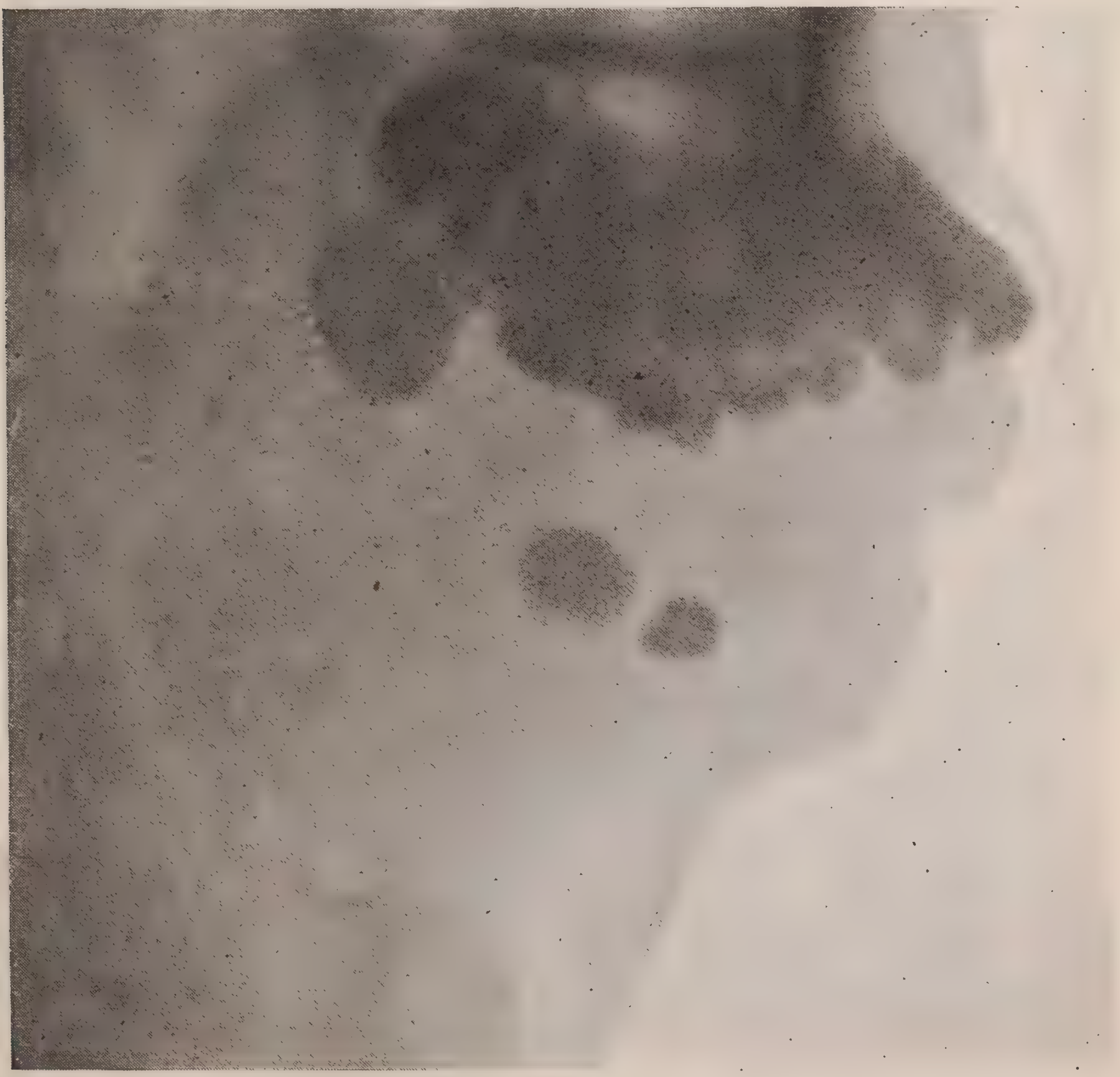


Fig. 1—An X-ray of right side of face (Taken by Dr. L. E. Custer).

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*Given as a clinic, Ohio State Dental Society, December 1916.

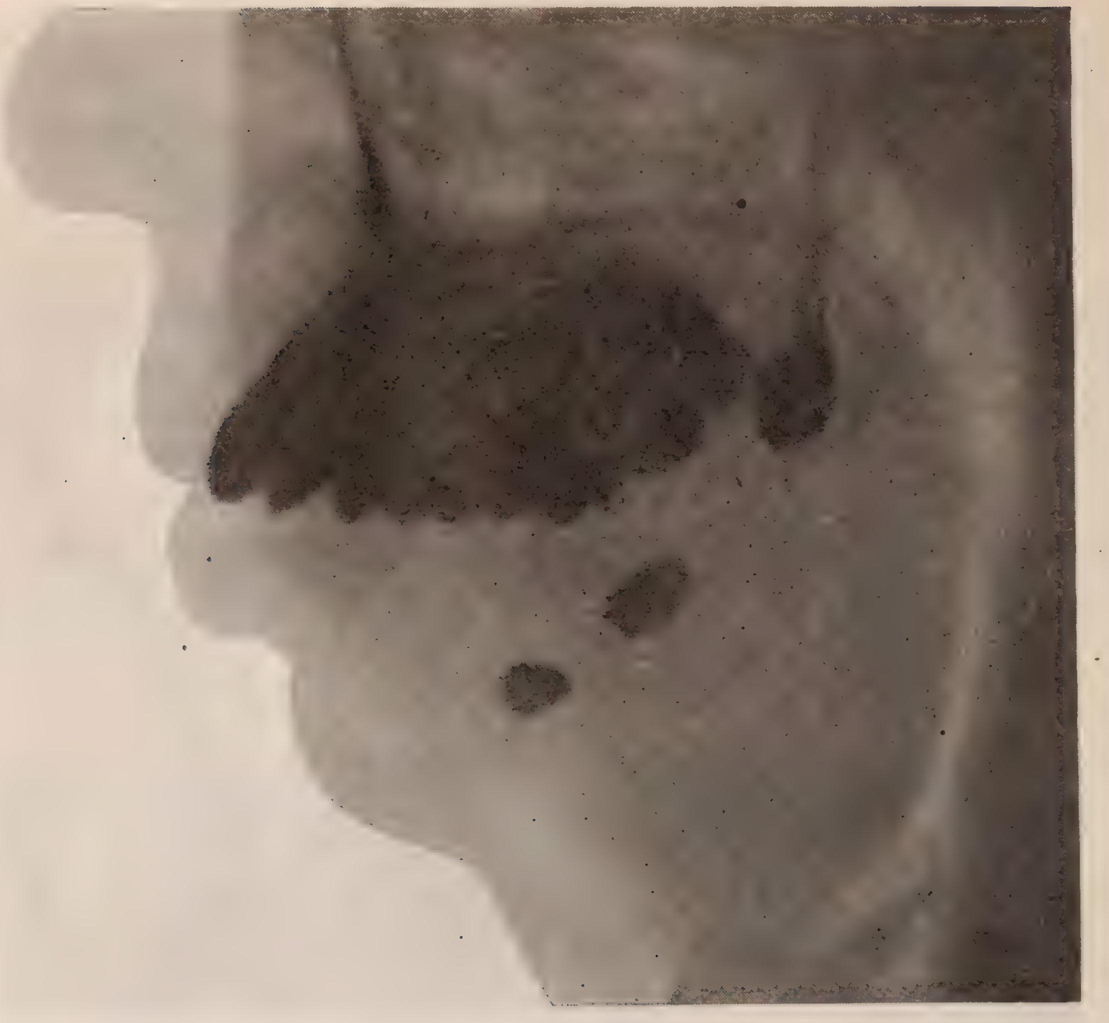

Fig. 2—An X-ray of left side of face. (Taken by Dr. L. E. Custer.)

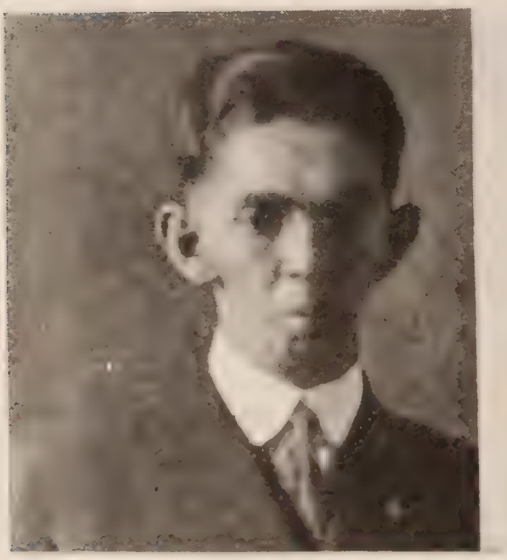

Fig. 3—Front view of patient.

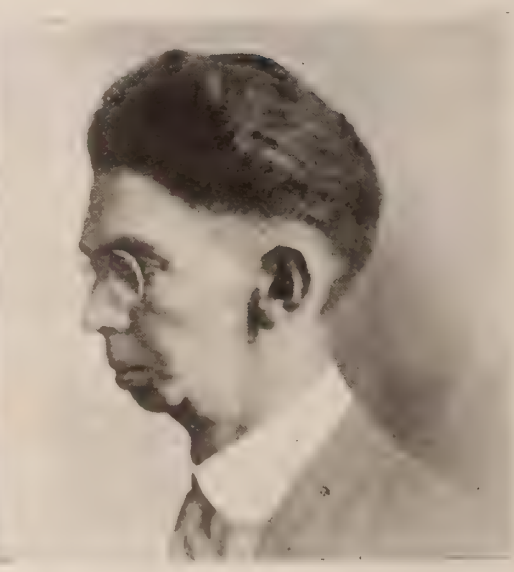

Fig. 4—Profile of patient.

loose, and were just hanging in place. He lost all of the teeth and the absorption of the bone is complete. There is no bone left at all, and he is now twenty-three years old.

A CLINICOPATHOLOGIC STUDY OF EARLY MALIGNANT CONDITIONS OF THE FACE AND MOUTH*

BY JOHN W. MEANS, D.D.S., M.D., AND JONATHAN FORMAN, A.B., M.D.

INSTRUCTOR IN SURGERY, AND INSTRUCTOR IN PATHOLOGY, RESPECTIVELY,
OHIO STATE UNIVERSITY, COLLEGE OF MEDICINE, COLUMBUS, OHIO

THE GREAT LATITUDE accorded the term "precancerous" has led to its application to a variety of lesions both cancerous and noncancerous. For the sake of clearness in thinking, it would be well to keep separate those lesions which may ultimately terminate in cancer from those cases which have recently assumed definite malignancy. It is of the greatest importance to the patient, however, that a malignant condition be eradicated completely while it is still a local process.

The majority of so-called precancerous lesions represent an incomplete or perverted reaction to some form of chronic irritation. When the cells of any tissue are injured or destroyed, there is an attempt at repair, and the neighboring cells are stimulated to reproduction. Normally the development of these cells goes on at a rate equal to or greater than that of the most

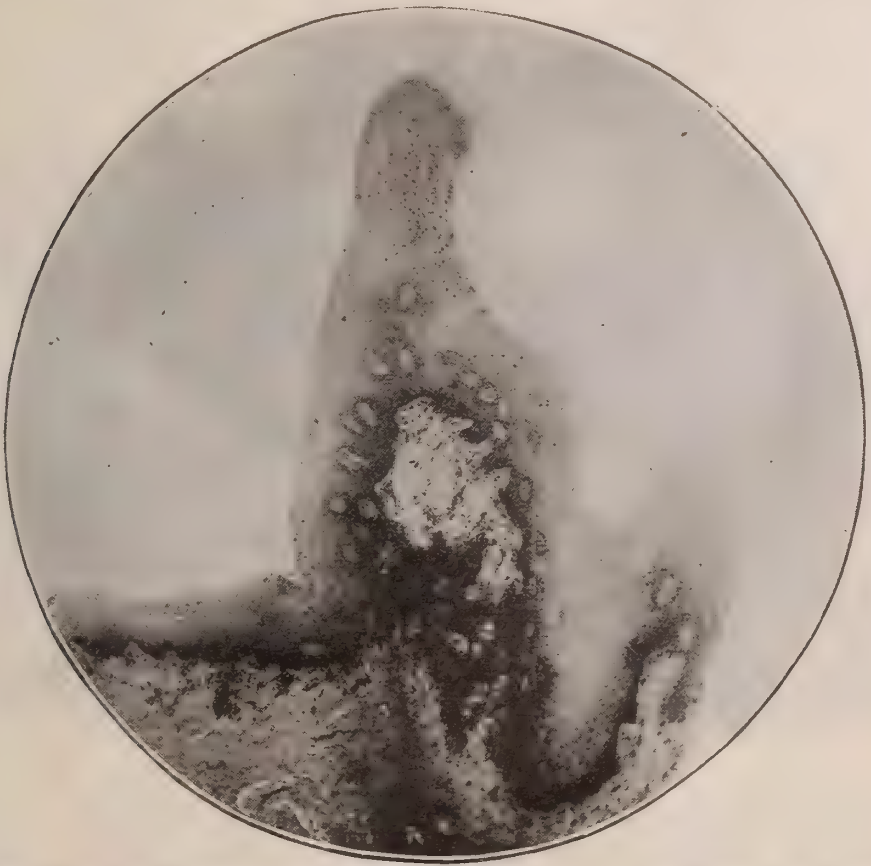

Fig. 1.—A small papillomatous growth occurring in the mucous membrane of the cheek opposite a jagged tooth in a man, aged 50.

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*Read before the Section on Stomatology (A. M. A.), of which THE DENTAL SUMMARY is the representative organ for the dental profession by special arrangement with the Jour. Amer. Med. Assoc.

malignant of tumors, and they soon reach maturity. In some cases, however, because of an influence of which as yet we know but little, these cells do not reach maturity but persist in a partially developed state and continue the process of reproduction far beyond the normal limits. Thus a group of cells is formed which are not co-ordinated and correlated with the normal growth processes, but are more or less independent of them. To these the term "cancer" is applied.

About the face and mouth, carcinoma arises from one of three types of cell:

1: The squamous epithelium of the skin and mucous membrane, giving rise to the epidermoid carcinoma or epithelioma.

2: The cell of the hair follicle, giving rise to the hair matrix carcinoma or the often erroneously called basal cell carcinoma.

3: The epithelium of the glands associated with the skin and mucous membrane, giving rise to the various types of glandular carcinoma.

The most frequent tumor of this region is the epidermoid or squamous cell carcinoma. The patients bearing this type of tumor give a history of having some form of lesion preceding the development of the cancer. The smoker's burn is one of the frequent initial lesions described by these patients. A small blister occurs which may disappear and re-form again. The histopathology of such burns has been so accurately and completely described by Bloodgood[1] that it will not be discussed at this time.

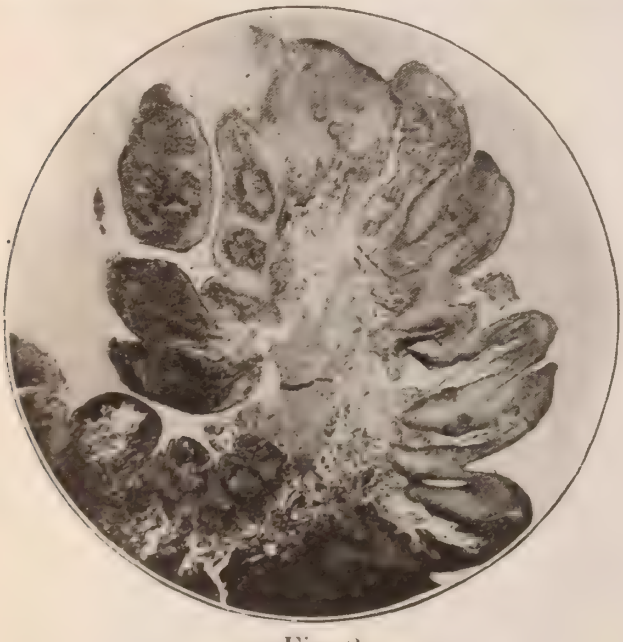
Fig. 2

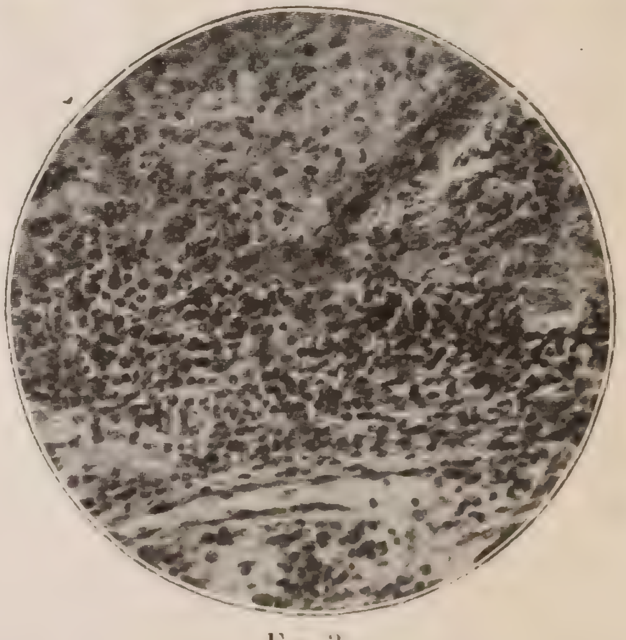
F g. 3

Fig. 2.—A papilloma on the tongue of a woman, aged 27. There was recurrence because of incomplete removal. Second excision successful.

Fig. 3.—Both an exudative (lymphoid in character) and a proliferative reaction are shown about the invading tumor cells. From a specimen of early epidermoid carcinoma of the lower lip.

In the order of frequency, the next "precancerous" lesion occurs as the result of mild traumatism repeated frequently over long periods of time. The irritation of a jagged tooth, or in many patients the habit of holding nails, screws, etc., in the mouth can be discovered in taking the history. Other lesions in which carcinoma develops are fever blisters, cracks, fissures, cuts which have refused to heal under ordinary care, papillomas and areas of leukoplakia. The last lesion would appear to be a very important one when cancer of the tongue is under consideration, as each of the patients in the seven cases in this series gave a description of the initial lesion as a thickened, hard area on the tongue.

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[1] Bloodgood: Carcinoma of the Lower Lip, Surg., Gynec. and Obst., 1914, 18, 404.

While the history of traumatism can be elicited in the majority of cancer cases of this region, and especially those of the lip, there are many lips which have been injured in a similar way and which do not develop cancer. In the last eighteen months we have seen two smokers' burns which, after persisting for a couple of months, disappeared and have not returned, and a sore developing in a fever blister which existed for nearly three months and then went away. Whether these will return and malignancy develop in them, of course, cannot be said. It would appear, however, that there is at work in the development of cancer, some factor or factors other than simple injury.

Injuries of the types described do apparently determine the location of the cancer in those individuals in which these other factors are operative. Of interest in this connection is the work of Miss Slye.[2] She reports that cancer of the oral region is not frequent in mice, even in those strains in which the majority die of cancer. Injury to these parts is also infrequent in these animals, whereas it is common in man.

These conditions may persist without visible change for some time, but more often they gradually spread and break down, forming an ulcer. This is usually of an irregular shape, having rather indurated edges which are not undermined. The base is smooth and grayish. There is often a thin, irritating discharge. Around the edges is a zone of bluish discoloration containing blood vessels. This is a picture of a fully established cancer. Its persistency is a significant warning, and when such a lesion is found about the face or mouth in a patient over 35 years of age, it should be removed quickly. Too much emphasis should not be placed on the age, for each case is more or less a law unto itself. For instance, we recently studied a case of carcinoma of the tongue which began in the twenty-seventh year of the woman's life.

In the twenty-two carcinomas of the face occurring above the line of the lower lip in the series which forms the basis of this study, twelve were of the hair matrix variety. In larger series the proportion of this type is usually greater. These tumors take their origin from the cells comprising the hair follicle. They usually begin as a subcutaneous nodule. After persisting for a variable period they break down and ulcerate. They present a tendency to infiltrate widely but not deeply, and seldom produce metastasis. A free excision results in complete cure in the vast majority of cases. It is in this type of cases, especially those situated about the nose and eyes, that the use of caustics, while often successful, will occasionally render the growth

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[2] Slye: Inheritability of Cancer in Mice, Jour. Med. Research, March, 1915, p. 193.

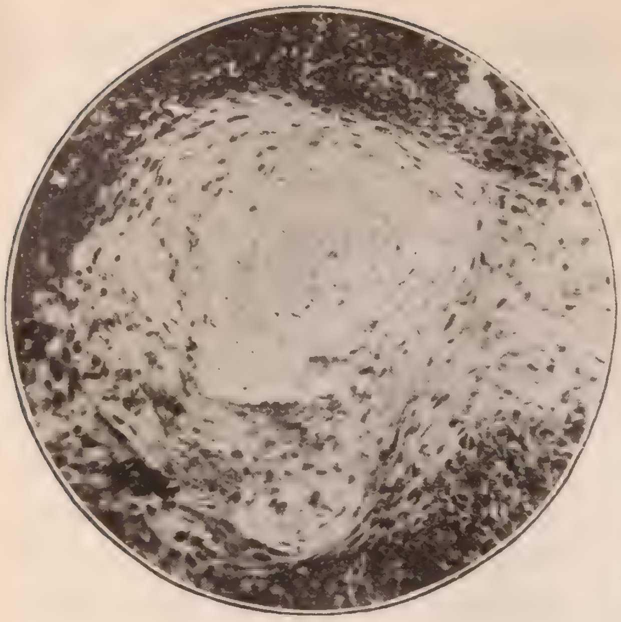

Fig. 4

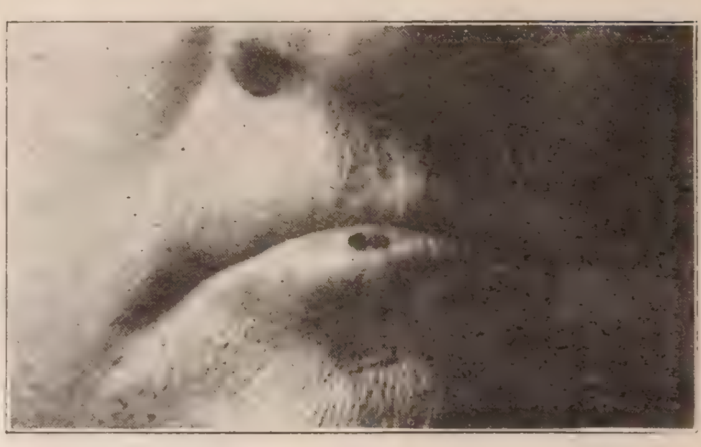

Fig. 5

Fig. 4.—A group of metastatic cells in a lymph node of the neck associated with an epidermoid carcinoma of the lower lip which began in a razor cut. Radical operation with no recurrence at the end of the third year. Note the cornified mass to which the tumor cells are being reduced.

Fig. 5.—An early epidermoid carcinoma of the lower lip. Patient is a plumber, who has the habit of holding nails, etc., in the mouth.

inoperable. The location must, therefore, be taken into consideration in selection of the method of treatment.

The tumor cells may be cuboidal, cylindrical or spindle shaped. They are characterized by a small amount of cytoplasm and by the fibrils which they produce. At times they occur in a densely packed arrangement and, when of spindle shape, resemble a sarcoma quite closely.

Occasionally a glandular carcinoma is seen about the face. Only cne of the type occurred in this series—a mucous gland, adenocarcinoma—arising in the floor of the mouth and extending over to the tongue and involving it.

The connective tissue lesions occurring on the alveolar border form an interesting group of tumors usually referred to as epulides. The soft or giant cell variety is the one type about which wages the controversy as to malignancy.

The misunderstanding which has existed in the past concerning the exact nature of the giant cells found in neoplasms has contributed to this confusion. The separation by Mallory[3] of true tumor giant cells from those of the foreign body type found in tumors has cleared the field in regard to the giant cell epulis. In the majority of instances, the giant cells are all of the foreign body variety. Again, these tumors may be confused with a malignant type of tumor of endothelial origin which exhibits intravascular giant cells and has been reported by Whitman[4] and Ivy.[5]

Since these tumors represent forms of lawless growth of connective tissue cells, the important thing is to find out just what these cells are doing.

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[3] Mallory: Giant Cell Sarcoma, Jour. Med. Research, April, 1911, p. 463.

[4] Whitman: Giant Cell Endothelioma of the Gums, Jour. Med. Research, January, 1914, p. 465.

[5] Ivy, R. H.: Mesothelial Tumors of the Jaws, The Jour. A. M. A., January 2, 1915, p. 40.

The rate of the growths should be ascertained by a histologic study of them, searching for mitotic figures, and determining the degree of differentiation to which they are attaining. It should be noted whether these cells are arranging themselves in a position normal to connective tissue, or whether they are atypical in form and arrangement. In a word, they should receive the same study as do connective tissue tumors elsewhere, and the diagnosis and prognosis be made accordingly.

The prognosis of giant cell epulis, in general, is good, provided careful excision has been made. The treatment should consist in a complete removal of the tumor and its point of origin.

Several other varieties of the nonepithelial malignant neoplasms occur in connection with the face and mouth. Sarcoma is a common tumor of the jaw. This tumor may arise from the bone or connective tissue of the region.

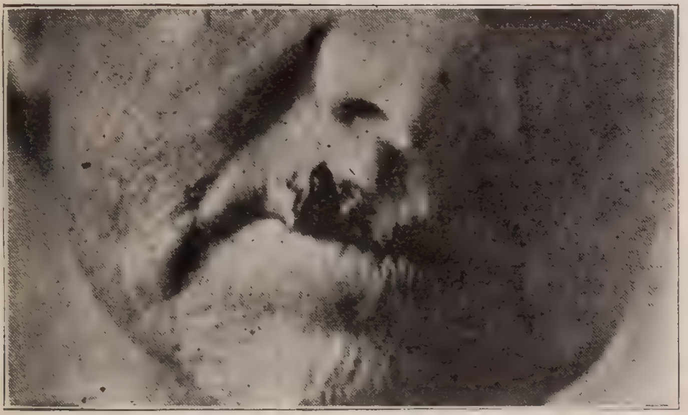

Fig. 6

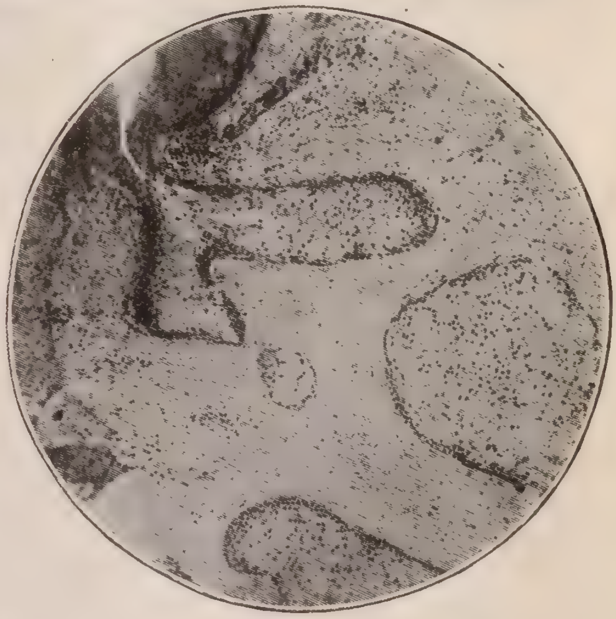

Fig. 7

Fig. 6.—A hair matrix carcinoma of the lip.
Fig. 7.—An adenocarcinoma of the floor of the mouth, which promptly invaded the tongue.

The symptomatology is largely determined by the location and the rate of growth. Although they are rapidly growing tumors there is but little pain until they become ulcerated or involve nerve trunks. These growths should be excised well beyond the line of visible infiltration. If metastasis has already occurred, since it usually takes place by way of the blood stream, the case is hopeless. If in the frankly malignant case the growth is still a local process; complete excision will result in a cure.

As the majority of cancers about the face and mouth are malignant epithelial tumors, metastasis to the lymph nodes of the neck occurs rather readily. These metastatic groups of cells, however, may remain inactive for a long time and then take on an increased growth rate. Only a small percentage of the late cases of cancer give rise to metastasis in distant parts. Radical operation, therefore, even in cases which present extensive involvement, gives a surprisingly high percentage of cure.

Cancer of the face and mouth is comparatively easy of diagnosis and accessible for surgical treatment. With this in mind, 3,007 deaths from cancer of the buccal cavity in the United States in 1913 is appaling.

It is our desire to emphasize the need for close co-operation between surgeon and pathologist, and that here as elsewhere in dealing with new growths, the important thing, both in treatment and in diagnosis, is a thorough knowledge of the behavior of the tumor cells in the particular case under consideration.

The end-results of surgical treatment of malignant tumors of the face and mouth compare favorably with those effected by medical science in the treatment of other disease (not considering, of course, the specific treatment such as antitoxin for diphtheria, etc.), somewhere between sixty and eighty per cent. of cures. The earlier the cases are seen the higher the percentage of cures.

The operative technic in this region has reached a high state of perfection. If further headway is to be gained against cancer of the face and mouth, it must be by the education of the public. It is the duty of those who see so many cases after it is too late to educate the dentist, physician and the general public concerning these conditions which so often terminate in cancer, and urge the prompt radical treatment of cancer while it is still a local process. The responsibility, therefore, rests with the stomatologist, the oral surgeon and the pathologist.[6]

DISCUSSION

Dr. Frederick B. Noyes, Chicago: There was one remark made in regard to the origin of the giant cells, about which I know we have had some rather interesting evidence in the last year in the Research Laboratory of the University of Illinois. The character of the giant cells in the tumors about the mouth is characteristic of origin by fusion of other cells in the region.

Dr. H. A. Potts, Chicago: The most important thing to be learned from the paper is the great importance of recognizing the possibility of these precancerous lesions. The chief thing is to avoid irritation. Any wound or abrasion on the mucous membrane of the mouth, lips or face, which does not heal or show a tendency to heal within ten days or two weeks, should be looked on as very suspicious, and should not be treated expectantly. We have all seen these cases. The secret of success in their removal is early and extensive operation to take in all of the growth and metastases as well. The chief point is that we must impress on the general practitioner of medicine and dentistry that these very serious abrasions should be looked after immediately and not given any palliative treatment that extends over a period of two or three weeks.

Dr. F. B. Moorehead, Chicago: In the past there has been an error in the classification of tumors of the mouth, particularly of the mesothelial type. A clear distinction should be made between the various forms of benign fibroma, the various forms of sarcoma and the giant cell tumors found in the mouth, which must not be looked on as highly dangerous. We may have, on the one hand, a giant cell tumor, the result of cell fusion, and, on the other hand, a true giant cell sarcoma. The giant cell tumor produced by cell fusion is a distinct pathologic entity, and is peculiar to the mouth. It is not the same either clinically or histologically as the giant celled sarcoma. We have begun the study of these peculiar giant celled tumors in the University of Illinois and hope to have something to say about them at a later date. The term "epulis" should be discarded.

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[6] In addition to the references already given, the following will be found of interest:

Blair: Tumors of the Mouth—A Collective Review, Internat. Abstr. Surg., January, 1916, p. 117. (This gives an extensive bibliography.)

Forman: Some Phases of the Cancer Problem, Ohio Pub. Health Jour., 7, 21.

Hoffman: Some Essential Statistics of Cancer Mortality Throughout the World, Panama Commemoration Volume, Chicago, 1915.

Means, J. W., and Forman, Jonathan: Precancerous Conditions of the Face and Mouth, Dental Summary, 35, 945; Epulis, ibid., 36, 494.

Tyzzer: Tumor Immunity, Jour. Cancer Research, April, 1916, p. 125.

HOW TO CONSTRUCT A WELL-FITTING GOLD CROWN*

BY DR. LEO ATKINSON, SALEM, OHIO

THIS CLINIC shows a method of root preparation and a method by which we can construct a gold crown which will eliminate all irritation of the gums, caused by ill-fitting crowns which are so frequently found by all of us.

ROOT PREPARATION

The root preparation I will not go into at length, but only to the extent that it must be thoroughly done, and I wish to give my method in a very brief way, hoping to make it clear enough so that anyone can accomplish the result.

First: Remove all decay, leaving cavities shaped as for an inlay, with the thought that this must draw and draw easily.

Second: Remove the enamel of the tooth, in whatever way seems best in each particular case, to a line just under the free margin of the gum, taking as little enamel as possible to get peg shape, to where you wish your finished crown to seat. This line I speak of should be the greatest circumference of the tooth which is covered by the crown, or in other words, to form the tooth to a peg shape, cutting off the point of the peg and making it flat.

CONSTRUCTION OF CROWN

First: You make your band as for a shell crown, fitting it to the lines where it is seated, under the free margin of the gum, taking care that it covers no portion that was not prepared. Then place band in position on root and proceed to test the fit of the band, as I will show with compound. By testing in this manner the compound will force out wherever it does not fit. Refit until compound will not force out. Then shorten band for articulation and give it the proper contour and points of contact with adjacent teeth. Clean it free from all compound, placing it back in proper position on root. Then heat inlay wax and pack full with a hot instrument, taking great care to fill every particle of space to its extreme depth. Then place excess of wax on top of crown and have patient bite for articulation. Then carve cusps and add wax for contour, wherever needed. It is now ready to cast.

Although it is possible to make a perfectly-fitting shell crown, it may be spoiled by the setting, which is impossible with this crown.

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*Given as a clinic, Ohio State Dental Society, December, 1916.

AN EXPERIMENTAL RESEARCH INTO THE NATURE OF NITROUS OXID AND OF ETHER ANESTHESIA*

BY GEORGE W. CRILE, M.D., CLEVELAND, O.

FELLOW OF THE AMERICAN COLLEGE OF SURGEONS

IF WE VIEW man and the lower animals as adaptive mechanisms, governed by the universal laws of physics and chemistry, then we must believe that every phase of human or animal behavior is occasioned by and in turn occasions physical and chemical changes in the body. Therefore an understanding of the vast alterations in the behavior of the anesthetized organism—changes which may range from the slightest depression of mental power through progressively deeper stages of unconsciousness to death, necessitates a search for the physical and chemical changes caused by the anesthetic. Accordingly, in this study we shall consider (*a*) the gross behavior of the anesthetized individual in a consideration of the relation of anesthesia to normal sleep; (*b*) the influence of ether and of nitrous oxid on the histologic structure of certain organs; (*c*) the relation of ether and of nitrous oxid to the hydrogen-ion concentration of the blood and to reserve alkalinity; (*d*) the relation of ether and of nitrous oxid to the infections, and finally (*e*) the clinical bearing of these studies.

(*a*) *The Relation of Inhalation Anesthesia to Normal Sleep:* The outward similarity in the appearance of sleep and of anesthesia needs no comment. The manner in which a child becomes unconscious under a sufficiently concentrated flow of nitrous oxid over its face closely resembles the manner in which that healthy normal child falls asleep. That sleep is merely the depression of consciousness and that sleep only partially suspends the function of the brain is indicated by slight responses to stimuli, such as the shifting of posture, the moving when called or when bright light strikes the eye, the response to tickling, etc. In other words, the receptors are still active during sleep. The activity of the receptors in anesthesia is evidenced as clearly by the increased pulse and respiration in response to trauma; and, if the anesthesia be light, by increased muscular tone, even by muscular movements. Another similarity is found in the resemblance between dreams during nitrous oxid anesthesia and the dreams of normal sleep.

(*b*) *The Influence of Ether and of Nitrous Oxid on the Histologic Structure of Various Organs:* As far as nitrous oxid is concerned, here also is found another resemblance to normal sleep. During normal sleep the histologic changes in the brain, the suprarenals and the liver caused by exertion, emotion, infection, acid injection, etc., are repaired; during nitrous oxid anesthesia also, the lesions in the brain cells due to these causes are repaired, and, as will be seen later, nitrous oxid exerts a measurably protective action on the suprarenals and liver as well. This protective action of nitrous oxid was strikingly demonstrated in a series of experiments on insomnia. A group of rabbits were kept awake continuously for approximately 100 hours. At the end of this period, their brain cells showed the typical physical changes of exhaustion. In another group these changes were partially restored after a single seance of sleep; while in still another group, in which the rabbits were allowed no normal sleep, but were placed under nitrous oxid anesthesia for one hour out of every six during a period of approximately 100 hours, the brain cells, as in the rabbits allowed to sleep, showed marked restoration, some cells, indeed, being in a *plus normal state.*

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*Read before the American Association of Anesthetists, Detroit, 1916.

A comparative study of the effects of ether and of nitrous oxid was made by keeping dogs under continuous anesthesia for four hours. After four hours' continuous ether anesthesia, striking histologic changes were found in the brain, the suprarenals and the liver; while after four hours' continuous nitrous oxid anesthesia, there were practically no changes in the brain, and but slight changes in the liver and suprarenals.

(*c*) *The Relation of Ether and of Nitrous Oxid to the Hydrogen-ion Concentration of the Blood and to Reserve Alkalinity:* In a series of H-ion concentration tests made for me by Dr. M. L. Menten, it was found that the H-ion concentration of the blood was increased by ether and by nitrous oxid, and that the acidity increased more rapidly under nitrous oxid than under ether; but that the total acidity in either case was proportional to the depth of anesthesia.

In measurements of the reserve alkalinity of the blood made for me by Dr. W. B. Rogers, he found that during anesthesia the reserve alkalinity gradually decreased, the total decrease being greater under ether than under nitrous oxid. He found also that the alkalinity of the spinal fluid and of the bile was altered during anesthesia.

It is significant to note here the fact that the histologic lesions in the brain, the suprarenals and the liver, caused by ether and by nitrous oxid, though varying in degree, are identical in kind with those caused by the intravenous injection of acids, as with those resulting from insomnia, exertion, emotion, infection or physical injury.

We must conclude, therefore, that the histologic lesions of inhalation anesthesia are acid lesions; and since acid lesions are restored only during sleep, that the same must be true of the lesions of anesthesia.

As long as fifteen years ago it was believed that all anesthetics interfered with the use of oxygen, this being the method by which anesthesia was produced. It is true that deep asphyxia may cause anesthesia, but in such asphyxia as is due to obstruction of the larynx, the patient remains conscious and feels pain, though he is markedly cyanotic, while under good inhalation anesthesia, the patient is pink and unconscious. It would seem, therefore, that interference with oxidation alone is an insufficient explanation of anesthesia. On the other hand, the postulate that anesthesia is an induced acidity is not only supported by the laboratory studies we have mentioned, but by the clinical phenomena of anesthesia as well.

It may be in place to refer here to Lillie's notable studies of the mechanism of ether anesthesia. He has demonstrated that the addition of ether to the seawater in which arenicola are living causes changes in the semipermeable membranes, as a result of which these membranes become less permeable to the passage of ions. As life itself is dependent on the permeability of the cells of the organism to the passage of ions, this action of ether suggests a further explanation of anesthesia, though its application has not been worked out in detail.

(*d*) *The Relation of Ether and of Nitrous Oxid to the Infections:* We have already referred to the protective action of nitrous oxid in the presence of the stimuli of continued consciousness as in prolonged insomnia; and other histologic studies have shown that morphin also protects the brain, suprarenals and liver from the destructive action of prolonged or intense stimuli. It follows, then, that since the effects of an infection on the brain, suprarenals and liver are identical with the effects of insomnia, emotion, etc., then the administration of nitrous oxid and morphin will in part protect the organism against the damaging effect of infection.

Summary of Experimental Findings: Nitrous oxid and ether anesthesia alike cause an increase in the H-ion concentration of the blood, the spinal fluid and the bile; and progressively decrease the reserve alkalinity of the blood Ether causes marked histologic changes in the brain, suprarenals and liver, these changes being identical in kind with the histologic lesions caused by acid injection, or activation of any kind. Nitrous oxid and morphin each measurably protect the brain against histologic changes due to infection, while ether increases the damaging effects of infection.

(*e*) *The Clinical Bearing of These Studies.* The identity of the phenomena of anesthesia with the succession of clinical symptoms which accompanies an increasing acidosis, combined with the fact that the histologic changes produced by nitrous oxid and by ether are identical with those caused by acidosis, supports the postulate that anesthesia is an induced acidity. If the acidity is slight, anesthesia is light and the patient responds to even slight stimulation. As the acidity increases, the anesthesia deepens—first, associative memory is lost, but the cutting of the skin still causes involuntary movements; then muscular tone is lost, and even the strong contact stimuli of a surgical operation cannot drive their impulses through the brain to the muscles; and finally, the decreasing alkalinity may so nearly approach the neutral point that even the circulatory and respiratory centers, which are especially adapted to respond to the stimulus of increased H-ion concentration, fail to respond; respiration and circulation are suspended and acid death—anesthetic death—follows.

These studies explain why a patient, whose reserve alkalinity has been seriously reduced by exertion, emotion, physical injury or infection, or, by reason of starvation, interference with respiration or impairment of the liver or kidneys, is approaching acidosis, does not take an inhalation anesthetic well; why there is much nausea and slow recovery from anesthesia in some cases and death in others, and why, in particular, children who are near acidosis always pass into that state and die unexpectedly.

These facts show how necessary it is for the surgeon and the anesthetist alike to realize that during the operation each is draining the store of reserve alkalinity. If the surgeon employs a local anesthetic, uses gentle manipulation and produces the least possible trauma, he conserves his patient and demands from the anesthetist less of the damaging inhalation anesthetic. The anesthetist in turn conserves the patient by using the lightest possible even anesthesia administered with the least psychic trauma.

These studies show that for the bad risk patient, nitrous oxid anesthesia is to be preferred to ether, and that analgesia with local anesthesia should be employed, with general anesthesia only when it is demanded by certain phases of the operation.

These researches suggest the value of a mechanistic view of the phenomena of anesthesia and attach a high importance to the work of the anesthetist.

In my own clinic we have now administered nitrous oxid anesthesia in over 15,000 cases without a death; and moreover, as our knowledge and experience accumulate, we are able with increasing accuracy to adapt the anesthetic to the individual.

1021 Prospect Avenue.

Concerning Cancer

Cancer is not a "blood disease," but always starts as a local affair; hence it can always be cured by removal if discovered and treated early enough.

Cancer in the beginning may cause no pain or other symptoms of ill-health.

Cancer is probably not hereditary.

Cancer is not contagious.

No up-to-date doctor will treat a condition that might mean cancer without *thorough examination.*

The cancer patient must learn to seek treatment as promptly as a patient with appendicitis.

Precancerous conditions can be detected in the mouth eight years prior to the operative stage. If suspected decayed tooth structure and debris removed from outside of teeth should be submitted to the bacteriologist at once for examination.

SOME MECHANISMS UNDERLYING ORAL INFECTIONS AND THEIR CONSEQUENT LOCALIZED AND GENERAL LESIONS*

BY WESTON A. PRICE, D.D.S., M.S., CLEVELAND, OHIO
DIRECTOR OF THE RESEARCH INSTITUTE OF THE NATIONAL DENTAL ASSOCIATION

(*Continued from page 378 May Summary*)

Here is a case that is being treated in the Research Institute. This woman was just like a cast when we started; she could not move her hands, she could not move her knees, they were perfectly rigid; she is now walking on crutches. She had been nine years getting worse and worse and had the prospect not only that she was going to be petrified, as she called it, but her husband had said she must do one of two things: she must die or she must get better. She had four beautiful children, one after the other, and they had been given away. The dream of her life was lost; she was helpless, she was hopeless, she was to have her husband leave her or she was to get better or die. She had been in different hospitals without avail, but now with no other treatment, the fingers have all straightened out, she can move the joints which were perfectly rigid, almost perfectly straight, and at the time we started she could not flex them an inch. The next slide shows the dental condition. There was a crown on the lower bicuspid; which tooth had a fistula. There was no area of absorption around the lateral, which had a crown but no fistula, and this lateral with an abscess, a molar root and a bicuspid root, all five with areas of infection and only one with a fistula. This is particularly interesting because this woman, with no other treatment than that in relation to the dental infection and the stimulation of the chemistry of her own body, was put on her feet and last week she sent word to me that she was again running her sewing machine. Now, for a woman who could not even bend a joint or rotate her body, and who was destined to have her husband leave and have the tragedy of having her home broken up and has now the prospect of having her children back, that one case is compensation enough to me for the little bit of sacrifice I may have made in trying to build up this work.

Here is a case I have watched develop that I think I had something to do with myself. This woman has developed an arthritis, as you see by her fingers, and I will show you the root filling that I put in some eighteen years ago. I thought I was doing quite good work at the time, and some two or three years ago I took that root filling out and made that operation over again. She had gotten to the point where she could only get around with the greatest of difficulty on crutches and she was dependent entirely on being carried to the street car or the automobile. With no other treatment she is now walking all about her home, makes her beds and walks up stairs, and she says that nothing else that she knows of has had anything definite to do with it except the treatment of that tooth which I myself probably caused. Now I may be a lot worse than the average dentist, but I am afraid the average dentist has been guilty of sending a whole lot of people to the rack with rheumatism. I am not only afraid of that, but I am sure of it. I am sure that modern dentistry has been creating the ideal conditions for this type of organism to grow and the tragedy is that the amount of infection that will develop around an infected area like that is ample for the producing of a very definite and continued arthritis. We thought it took a number of teeth or a large area of infection. We now are more afraid of an area of this kind than we are of the type where we have a larger quantity of infection. We must differentiate between these of rapid growth and the slow, insidious infections.

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*Stenographic report of a lecture delivered before the Iowa State Dental Society, 1916.

Here would be an illustration of selectivity. This woman has lost her voice almost completely, for five years, and has had it failing a great deal of the time for twenty years. She has a chronic infection around the laterals and centrals. Here are two different cases of selectivity. The significant thing about this is that the organism in this case was selecting the throat, in this instance producing a chronic irritation, and later the voice was affected. This woman recently talked to me over the long distance telephone from a city a hundred miles away to show me that she could now talk perfectly over long distance even, which she could not do for five years. It is wonderfully significant to me that we have a large number where the voices have been affected in this way and it is particularly significant because so many cases of voice disturbance are due to streptococcal infection. Here is a school teacher who had lost her position for two years because she could not talk. Here was a pulp which could not be extracted but the pulp died and we had develop in this case a very definite infective process without any local irritation, but it selected out the throat and without any other treatment than that, this woman's voice came back and she has been teaching for three years. Now some of these organisms will lodge in the tissues or in the bone and linger there for months at a time, for years even. Then later when opened up they give us a pure culture and this organism shown here is one that accompanies pneumonia infection. We asked her if she had ever had pneumonia and she said, "Yes, seven years ago I had pneumonia." Now it is wonderfully significant that that organism grows with two different types of infection. You have all had this experience. You have drilled into a tooth that was not sore and immediately it flamed up just like touching a match to gun powder. This mouth was perfectly normal at the time, but by ten o'clock that night was so infected and her mouth and face so swollen that she had a temperature of 103; she came to the office the next day with complete lassitude and prostration, just the picture you have all seen. What had happened? I had opened up her tooth and let the air in and this organism has two different types of expression.

When it grows without air it produces no pus and no pressure and grows very slowly. It grows very rapidly in the presence of oxygen and we have produced here a most profound growth, a rapid growth, with the formation of this very poisonous toxin which it produced and completely and excessively prostrates the patient, just the thing we have all seen often when we have let air into a tooth.

When and where will we use vaccines? Here is the jaw of a young woman twenty years of age, who had a necrosis so extensive that you could inject fluid around or into the socket where the first molar was removed and it would come out around the second or third molar either lingually or buccally. It did not respond to any local treatment but when we took a culture and treated it, it cleared up just like magic and this girl, who had been prostrated in bed, got up in a few days and is perfectly well. What had happened? She was suddenly overwhelmed by that particular strain of organism and her body could not whip up its resistance enough to destroy the organism or its toxins. Immediately we put on the lash and the whip and made nature, by the use of the added vaccine, whip up the chemistry of the body. Nature was able to build up the needed anti-body and destroy this toxin. The result was that we completely eliminated this infection with nothing else but the vaccine. Now where will you use vaccine? I will say you may do so quite successfully in people under 20 or 30 or 40 years of age, but less successfully with older people; the ability of the older people to respond is so much less.

Now here is a particularly significant case. You notice that in the area of absorption around this distal root of this molar the root itself is absorbed. This gentleman has been suffering from bladder infection which has given him so much trouble that for the last five years he could not go into public life at all by reason of lack of control of the urine. We found in the urine the same strain of infection apparently that we found in this distal abscess. With no other treatment than the removal of this dental abscess, the extraction of this tooth and curetting, his bladder trouble was so greatly corrected that for the first time in years he left the city and went to New York to visit his son. We had removed apparently from his body the source of continuous infection. Now this particular patient had in succession a whole series of infections. The first complaint she had was she noticed in getting on a street car a stiffness of the joints; a little later she had a heart lesion; a little later she had liver and stomach disturbance; a little later she had a large carbuncle and then multiple furunculosis all over her body and sties on her eyes, and from the infection taken from the mouth and from these different lesions we apparently got the same strain of organisms. We will show you in the motion pictures some taken from the boils and some from the teeth, showing the same organisms, and yet this woman would not have those miserable teeth extracted nor would her physician encourage her. I put that slide on partly because I want to emphasize the fact that in so many instances we do not get the proper co-operation on the part of the medical profession to have dental symptoms cleared up. On the other hand, we get sometimes such active co-operation that they want everything extracted in the mouth and that is, of course, as far in error as is this condition.

Now we like to differentiate between those reactions of the body that are due to mechanical pressure and those from infective processes. These express themselves more likely as mental disturbances or very often as mental disturbances. Here is the case of a girl 22 years of age, who has been for two years in a sanitarium or asylum because of mental disturbance, really an insanity. She was brought to Cleveland from another city for examination, and we found two impacted third molars above and the distal root of a lower first molar. With no other treatment than the removal of those impactions and the root I show you, she was sent back to the asylum and in two weeks she was dismissed as cured. That was in June of last year. She went to Boston to study music and is studying now in grand opera, and recently in a contest with sixty others, won first prize. That girl is apparently perfectly sane. The next shows a rather striking case, a girl who is 30 years of age who has had this lesion for 12 years, and she has part of the time been in an institution because she was mentally disturbed. The removal of this third molar, which you see was impacted and developed backwards, with no other treatment than the removal, has enabled that girl to take an important position in an institution where they are studying feeble minded people and she herself was at one time in a similar institution for part of the time the past ten years. She is apparently perfectly restored and the significant thing is that these cases both date back to the time of the development of the third molar, from 18 to 20 years of age. It is important to keep that in mind. But the reaction that we would get from infections are not like these quite purely physical reactions to which I am referring.

Now I will show you three or four pictures from Dr. Hartzell's splendid work, than which there has never been anything so significant in the whole study of these processes. This gentleman can now put his hands behind his neck and over his head. Six weeks before this he was in bed practically helpless and suffering intensely. The infection was found about these roots and with no other treatment than the extraction of these teeth and the making and use of a vaccine that man in six weeks went back to his position, as a street car conductor.

The next is one of his important cases. This woman had been in the hospital a great deal of the time for three years and, as you see, her knees and ankles are badly swollen and she was bed ridden, suffering a great deal. Month after month they were writing in the hospital record in Minneapolis, "Present treatment doing patient no good." The next slide shows the dental condition, an area of absorption and infection. In all these cases the viridans streptococcus was isolated, and a vaccine made. This woman was so greatly improved in a few weeks that she could straighten the joints and she was able to walk out of the hospital and go back to her family.

The next shows a case suffering with an iritis due to dental infection which entirely cleared up with no other treatment than the removal of the dental infection. All are illustrations of the selectivity of the organism for certain tissues of the body.

Here is a young man in my own care who had the painful recognition that his mother, who had been bed ridden, had much the same difficulty that he was having himself and, fearing that he was going to have arthritis, personally presented himself to have all of his teeth extracted. We made an examination and found five teeth in his mouth only partly filled, and we got the history that these had been filled with mummifying paste. We found that we could get a strain of viridans from nearly all of them by the method we use of aspiration. Now the method of aspirating is an important one; and we can get an infection from practically any condition that we ever tried where it showed an absorption and infection and we are coming to think that all absorbed areas are infected areas. This is a tubing with a rubber barrel to which is attached a piece of copper tubing with a glass tip; the tip may be attached with sealing wax or sticky wax, the entire barrel being filled with sterilized water. As we aspirate we lower the vacuum in the tooth, which produces a pressure and we will get an oozing right into the tooth and you can make almost any tooth bleed with the instrument. The instrument has proved that we cannot sterilize an infected root with any means that we have ever tried. We have never once produced a condition from which we could not aspirate an infection at some time later. Whether it was a reinfection or whether we had failed to remove all of it I do not know. Recently someone told me after using the instrument, that I did not have the patient take a bath; said this was strong enough suction to draw germs from the whole body. That is not true, but it will draw germs from some distance. Now, when we cannot get the germs immediately, we pinch that copper tubing off, which is sealed perfectly into the tooth with cement, with a pair of dull pliers or nippers, and that leaves us a small vacuum in the tooth and the next day we will practically always find the tooth filled with fluid, and whether we use ionization or any other form of root medication we have never once produced an area sufficiently sterile so that we could not either immediately or later get germs from it by this method of aspiration. Now, it does not mean, please remember, that ionization is not a good thing. It may prove that ionization is a good thing. It only illustrates that infective processes do not have to be entirely removed at the apices of roots, but if we largely remove the infective process, nature takes care of the balance, and I think that is the best we generally do. And I will say further that when we open into a streptococcal infected root, I firmly believe we will have streptococci around that area and in the bone for months afterwards unless we curette. We will pass this and not take time to discuss it at greater length; we have already taken too much time.

Another of the mechanistics of infection which will immediately appeal to you is the pumping motion that takes place when we bite on teeth with infection at the apices. The very process of putting pressure on the teeth drives the blood out, and when we withdraw that pressure we let the blood come back into the tissue. We are making a pumping motion and we will readily have a suction, a pumping motion sufficient to make organisms that are already in the tissue pass into deeper tissue.

This little mass of debris which is so rapidly going out of sight by the clouding of this film, will contain probably ten million to five hundred billion bacteria; that is about the amount you can put on the head of a pin, and you will readily understand that when we put a force on that tooth of one ton in twenty-four hours, you get some idea of the effect of that pumping motion. Now, if you were to make an estimate of the number of germs in the mouth you would find you could hardly get a sheet of paper large enough to hold the figures. So that you would then have the opportunity not only of the pumping motion, but with this infective process you would have the opening up of the gingival notch, allowing organisms to go directly into the tissue, and there is in my mind a great probability that some of the organisms that we will study with the motion pictures go directly into the peridental tissues which are opened up because of their motility when the sound tissues are opened up. You can see the force that will go through the debris. They have a very definite power; they have an ability to push things out of their way.

This is a splendid slide, given me by Dr. Buckley, and shows beautifully the circulation that comes through the tissues. Dr. Hartzell has recently brought out very forcibly, and I think perhaps one of the most important contributions made for a long time, that infection passes into the gingival margin, into the gingival membrane and down into the peridental tissue to the apex and infects the tissue about the apex probably more often than the germs come through the blood stream to produce an apical infection. He has shown a slide in which you can see the germs in the tissues and the very fact that the poly-morphonucelar is a leukocyte that is called out in reaction to streptococcal infection, and the fact that it is present suggests that it is a streptococcal infection, but we will find that the motile organisms enter into it also.

Now the lesion we are most concerned about is not the fistula coming under the lip or hard palate, but one without any fistula whatever, a so-called blind abscess. How are you gentlemen to recognize it without a radiogram? I do not know how any dentist can intelligently or safely diagnose without either the use of an X-ray machine in his own hands or one available where he can send his patients for radiograms. I cannot conceive of the dentistry of today doing this class of work without access to one.

Coming again to the mechanisms, there are two principal processes of infection; one will be the embolic where the organisms pass through the blood stream and are occluded in the blood vessels, blocked in the blood vessels, and produce an actual stasis and clot, which clot itself breaks down and infects the tissues; the other being the selectivity for the tissue by the toxin produced which prepares the tissue for the organisms. This then, would be the process that we speak of and show in the motion pictures. The bacteria would pass easily through the large blood vessels but the blood of an animal or the human blood would have the power of agglutination or forming into clots The organisms will pass through the large blood vessels and even through the small vessels if they can go through singly, but the fact that they are agglutinated into clumps blocks the passage and you will see that very thing in the motion pictures and finally the complete stopping of the circulation.

The stomach ulcer is one of the most important problems we are considering today because so many patients develop cancer of the stomach as a sequel to stomach ulcer. And I think Dr. Mayo's recent work has given us an emphasis that we cannot overlook and it is probably one of the most important of recent contributions. This would give us a typical ulcer, and it does not occur because the patient swallows pus which attacks the stomach wall, but the organism passing through the system with selectivity for this tissue occludes the blood vessels, breaks down the tissues and has a digestive fluid capable of digesting those particular tissues, and we have the peptic ulcer breaking out in the stomach on the stomach wall. This is one of Dr. Mayo's slides. He showed it at the opening of the Research Institute, and I would have given almost anything if you could have heard that address; it was one of the most masterly addresses, but it put a big responsibility on the dental profession. He showed this slide and there is a typical ulcer produced as he believed by a dental infection. And in the next slide is a cancer superimposed on a peptic ulcer, the result of the stomach ulcer, and he made the inference for us that he believed a large number of the cancers of the stomach were caused indirectly by dental infections. What is the significance? The dental infection producing the stomach ulcer, the stomach ulcer in turn producing the cancer. It has been found, illustrating the selectivity of the organisms for certain tissue, that when we take a certain strain of streptococcus from a particular tissue of the body and inject it into animals, that organism selects the same tissue in that animal that it had been taken from to get the culture. For example, if we take it from an appendicitis case when we inoculate animals we find that in sixty-eight per cent. of the animals it produced an appendix infection. While if we take the infection from miscellaneous sources, only five per cent. produced that selectivity. Do you get the significance of that? If he wished to take streptococcal infection from your mouth and from your appendix and from any tissue of your body that might be infected and make a miscellaneous mixture and inoculate it into an animal, only five per cent. of that would select the appendix, while if it were taken from the appendix infection alone, in sixty-eight per cent. of the animals the organism would select the appendix. When he took ulcer of the stomach here, in sixty per cent. it would select the stomach, and if he took it from miscellaneous sources, only twenty per cent. would select the stomach. Again, if he took the gall bladder infection, thirty cases selected the gall bladder and only eleven did so from miscellaneous infection.

What does it mean? It means, if it means anything, that if I should get that particular strain of streptococci into my mouth and into my system, and it would find lodgment, it might select out my joint or my heart valve. In other words, it means (I do not say it does mean, but it may mean) that if somebody plants a drinking cup with a strain of streptococcal infection which in his body is selecting his liver to produce the gall stones, and I drank of that cup it may be the source of my own development in the same way. In other words, we cannot yet tell how far-reaching this selectivity may be and how important it may be in the transmitting from one person to another. It may be that we really are subject to contagion almost to these organisms. Now certain chemicals select certain tissues. I think I showed you this slide two or three years ago when I was here. But now the significant thing is here, that this arsenic is a splendid illustration of selectivity just as mercury is a splendid illustration of the selectivity of certain toxins for certain tissues of the body. And we find that these great areas of absorption produced around the apices of roots, when we put formalin into the root, are the ideal conditions for infection from the gingival margin or the blood stream. I fear very much that I myself have planted literally hundreds of systemic infections by using too strong medication in these root canals. I hope I have not. I am very much afraid I have. I am very much afraid you have. I think one of the greatest mistakes the dental profession is making today is in over-treatment. Our surgeon would not think of using bichlorid of mercury if he was operating for appendicitis. Why? It is too strong; it will produce adhesions, and yet we continue to put strong medicines into the teeth. Yesterday or the day before a patient told me, "My dentist said that that tooth might give me trouble, but it would not be his fault if it did because he had used the strongest medicine that was known to his profession." He had done the very thing that would be most likely to produce an area of scar tissue around that root, which would be subject to infection because nature cannot tear it down and destroy it. Now, when we study the organisms in a mass of debris we will be surprised to find from ten million to five hundred million of micro-organisms, but what I want to emphasize is that a microscopic study will show forty-seven million in this case, but when he made the plate culture there were one million, or, according to the different media, he found ranging from one million to two million instead of forty-seven million. What is the significance? It is that not more than twenty-five per cent., if more than five per cent., of the organisms of the mouth will grow in any artificial media that we know of today, certainly not fifty per cent., and there is an immense field for research.

Dr. Benedict, whose work we know on this problem, has spent a large part of his time this year studying culture media and preparations that will make it possible to grow certain organisms and by the addition or subtraction of a small amount of a certain chemical, an organism will or will not grow, showing its wonderful selectivity. For example, there are organisms so sensitive that they will not grow in a culture media that is contained in a platinum dish, but will grow in a glass dish because they have to have a certain amount of silica and there is enough silica from the glass going into the fluids to make that bacteria grow. That gives an idea of the infinitely small amount of some chemical that will be sufficient for that purpose.

We have a tendency today to extract everything that has a dead pulp in it. If the pulp needs to come out some say, "Take the tooth out." Now I put this slide on taken from Dr. Black's wonderful pathology, the work, I think, of Dr. Arthur Black.

Here we have a large area of absorption shown, and after he has filled the root I want you to note the area of absorption getting smaller and smaller until it is almost obliterated. Dr. Rhein has done some work along that line and he has emphasized the necessity of filling to and beyond the apex of the root. I think there is abundant evidence today to demonstrate that when we have not a streptococcal infection we can expect to cure a large proportion of these dental abscesses. When we have a streptococcal infection, however, that is producing a systemic lesion, I myself have not the confidence to leave many of those teeth in the mouth. If the patient is doubled up with arthritis like the woman I showed you, who is now running her sewing machine and walking, I think extraction is indicated. That woman had her bad teeth treated for six or eight weeks and every week we made aspiration and week after week we were able to get the cultures by aspiration, and when we extracted the last tooth she got better much more rapidly than she had prior to that time; I believe we would have made a fatal mistake if we had left the one tooth in the mouth. I am not competent to tell you how to treat them, but I myself would not leave a tooth in the mouth with streptococcal infection that was producing lesions if I did not make an artificial fistula and curette, either that or extraction. If I have time later to discuss that problem I may do so.

As to the amœba problem. I think I need not say a great deal about that. Our studies on the amœba of the mouth are proving that it is not an important feature in pyorrhea, but that it is there because the bacteria are there. It is in many mouths in September, but not there in January, but again there in March, April and May, and you will also find that if you start to use the emetin in January when the organism is present that it will be there in large quantities in February, March and April after you have used it. In other words, it does not seem to be definitely related to the stages of the infective process of pyorrhea but is dependent on our northern climate and temperature. There are a number of arguments for and against it. I think one of the most important new things I can tell you is that we are now able to grow that organism artificially. The various organisms that you will see now in the motion pictures will be shown here. You have the streptococci that I have been talking about, a chain of beads long or short chains; the staphylococci or the short bodies. One of the things that will surprise you, if you have not seen it, will be the tremendous speed with which some of these organisms will move. The motion pictures now will give us the motility and behavior of these organisms. (Motion pictures shown from this point to close of lecture.)

When the germs are taken from around the teeth in a case of this kind we find a very typical organism growing there; when we take it from a deep cavity we get a practically pure culture. We remove the surface debris and take simply the pure culture from deep in the pockets and add it to a slide and put it in the field of the microscope, and in taking the pictures we let the light strike the mirror and pass up through the slide and be reflected from a prism into the motion picture machine. Here is a very motile organism inducing the caries in that particular tooth. If we study a mixed infection from that same patient's mouth we have this condition; notice the extreme rapidity. Now this, I think, was taken from a boil or a carbuncle; this was exceedingly serious and it had been diagnosed as produced by a staphylococcus infection. The organism taken from a long series of boils is shown in the next part of the film; note the organism and note its motility. The next part of the film will show you the same organism from an infected root canal. This man had not been without boils for nine months. After the treatment of this tooth he had no boils and has none at the present time, and apparently he was getting his infection from this dental infection. This is a more diluted culture but it shows the same organism. This last was taken directly from the root canal; the other was taken directly from the boil.

Here now we study the protozoa of the mouth, the amœba particularly, and you will note the slow migration. This is the amœba bacillus and you will notice the rhythmic motion. Now those who have suggested that it was a carrier of infection into the tissues have said that it did so by carrying the bacteria as such on its back, so to speak, across the tissues. This organism will take hours to travel a hundredth part of an inch. It simply goes round and round in this motion. The next variety does have a projected motion in one direction and this is the type that has been said to be the cause of pyorrhea, though I think not. It would be like imagining a fox squirrel taking a turtle as a means of locomotion; these bacteria swim in circles. This one has never been suggested to be the cause of pyorrhea, and yet you will notice how it does migrate directly across the field. Recently I said to a group of nurses that if they would feel around their teeth they might feel some of these, and one of them told me how she felt with her tongue and she did feel two or three. The organism is about one two-thousandths of an inch in length. Here you will see that variety again and here is one on this side of the field, and you will notice how strikingly it moves. This is a mass of ingested food that contains a great many bacteria. These organisms that you see swimming here are so motile that they will swim almost as rapidly in proportion to their size as a dog would run in proportion to its size. You see in this field the trichomania, as called by some; it is not, as the trichomania has only one flagellata at one end of the body as you will see here. Here is the enlarged protozoan that I spoke of. It is not properly described in some of the literature. We will call it organism "Y" until we find a name for it. This would be the typical appearance of the mouth with the ordinary amount of bacteria except you would not often find these; and here it is again. Now watch that as it swims up the field; that is the trichomania that you will find in some of the literature and is thought by some of us to be connected with the important forms of infection. There you see them go through the field like a submarine. The dark field will show a hundred organisms to ten that you would see without the dark field.

We will study the circulation in the lung of a frog, which is done by cutting a hole in an anesthetized frog's back—remember it was anesthetized—and another in the chest and letting the light in through the back and out of the front, and we get this picture. The heart is pushing the lung with every beat, so that you get the rhythmic motion, but as you get used to it you will see the red blood cells; those are the red blood cells drifting through the tissue and these large ones are the leucocytes of the white blood cells. Here is the blood stream showing the gushing stream in the artery; we see the gushing of the heart. There you have that highly magnified, the red blood cells are as large as saucers. Here is a fork in the stream, and note the gushing at the fork. There is the capillary circulation. Now this will show you the veins gathering up the blood; see the blood going back into the veins; here is an artery; here is a vein gathering up the blood; see how the blood comes to a standstill between each beat. Note percolation through the capillary system and see the difference when we put a few organisms, only two drops of a culture taken from the mouth, into it, into that same system. Here you have the fork and just at this time we injected two drops of a culture of mouth organisms and we immediately got the formation of the embolical clot in certain of the arteries and they focused on the clot here. Here you have the very slow circulation; it gets more and more slow. If you will watch this large blood vessel you will see that it has a mass of slowly moving bacteria and red cells. There is an obstruction somewhere; there it breaks loose; there is the formation of the embolical clot and ænemia surrounding it; see it breaks loose. Here the vessel is almost entirely stopped up and here we have the complete ænemia; there is no more circulation in the capillary; here is the blood vessel highly magnified and you see the bacteria right in the mass of the blood vessel and a complete ænemia all around. Now if that organism would have the power of digesting the tissues surrounding it an abscess would form. If on the other hand, the tissues would produce a digestive fluid that would destroy the bacteria, they would be destroyed and an abscess averted. We are constantly fighting a warfare against the organisms. Some day the battle will be over and they will ultimately win. For the present you and I are alive. Why? Because we have enough resistance, we have enough fighting ability to overcome the infection of the organisms. Some day there will be too many of them, or our resistance will go down so that we cannot carry on the fight. Will it be when we are sixty years of age? Will it be when we are seventy? Will it be when we are eighty? That will depend largely on how well we keep up our resistance and how perfectly we keep our bodies from being overwhelmed with organisms. And we as dentists have in our power and in our care probably years of the life of many of our patients; I think we might say perhaps at least one year; perhaps we might say ten years of the lifetime of every patient who comes into our care, because if we produce in that patient a condition that will let infection develop and allow the body to be overwhelmed that patient must necessarily succumb earlier in life than would be the case if we could keep the patient from that infection. My prayer is that we, as dentists, may be able to add to the lifetime of our patients and not subtract from it. I feel, in fact I am perfectly confident, that I myself have shortened the lifetime of some of my patients by creating in their mouths conditions that encouraged infection and produced actual infection that invaded the body and brought on some form of these systemic lesions. And, on the other hand, if we as dentists can keep our patients from getting these infections and thereby prevent those catastrophies coming to them, I know of no greater service to humanity. I tremble when I think of the possibilities. When I realize that in one of the London hospitals they have recently made a study of the children in that asylum or that home for orphans, where they can tell precisely their histories, because they have had entire care of them, and where they studied the source of the heart infection, and they found that fifty-two out of every one hundred of the children developing a heart infection had as the primary lesion a dental abscess, I tremble, and I think of the possibilities of my neglecting the children that are in my care and thereby producing heart infection or other infection. Just as heart infection may be produced in the children's mouths so easily, just so easily may this whole train of infection which we have considered to be diseases, but which we now know to be simply symptoms of disease, be averted. There is today no such a thing as gall stones as a disease; gall stones are symptoms of a disease, or systemic infection. Peptic ulcer is not a disease; it is a symptom of disease, the disease of systemic infection. Appendicitis is not a disease; it is a symptom of disease, the disease is systemic infection.

Did you ever plant a systemic infection? I did. I am afraid we are all doing it. I hope we may do less of it in the future.

REMOVABLE BRIDGE WORK*

BY J. O. ZUBROD AND R. J. MORRIS, EVANSVILLE, IND.

SOME EXCEPTIONS may be taken to the term "removable bridge" which we choose to call all forms of prosthetic work that replace one or more teeth, without covering the root of the mouth, or the use of the lingual bar of rubber on the lower. This appliance will remain in place under all conditions, but can be removed at will. You may call this work anything you want to; some call it partial-plate work—that is a matter of individual preference. We use the term "removable bridge" as it sounds better to ourselves. This work is elevating to our profession, and also earns a better fee than the making of a partial plate.

This service is the most exacting rendered by the profession, even more so than root-canal work, for the canal filling will not show up for some time, while a removable bridge, if faulty, will show up at once. It is our wish that you be conservative; don't try to place a removable bridge everywhere, for sometimes a vulcanite plate is indicated.

INDICATIONS

Where the abutment teeth incline to or from each other and cannot be paralleled; where we wish to retain the vitality of the pulp, or the patient objects to devitalization; where good abutments are not available for a fixed bridge, and where there are no posterior teeth.

We will not go into the technic for construction for the work, but would call your attention to the work of Dr. Peeso on removable bridge work, and an article in the June issue of THE SUMMARY on "Hygienic Removable Bridge Work," by Dr. J. W. Beach, of Buffalo, N. Y., for the wire crib; the "Transaction of the Golden Anniversary of the Illinois Dental Society" for the loop clasp, and other text-books on this subject. We strongly recommend that the wide clasp be discontinued, except on crowned teeth, and that the round clasp wire be used in its place. The use of the ready-made lingual bar, all forms of special-made attachments, the detached-post crown, the ready-made split pin and tube, are recommended. The manufacturer has perfected these articles, and they are as perfect as the porcelain tooth used today. The writers have used them all and some made by themselves; a mere matter of individual preference.

We submit today for your approval or condemnation, six forms of removable bridges. All we ask is that you be charitable and forgiving, as we were drafted for this clinic; one of us is a specialist on orthodontia—the other only a country dentist.

Case No. 1: Replacing the upper or lower bicuspids and first molars, using the crib or loop clasp on second molar and cuspid, using any make detached-post crown with the Baker pin and wire. Indicated where the dentist or patient objects to devitalization.

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*Given as a clinic, Northern Indiana Dental Society, October, 1916.

Case No. 2: Replacing second bicuspid and first molar, using Peeso jacket crown on second molar and a fixed shell crown on vital first bicuspid. This can be used as a fixed bridge with a loose joint, or as a removable bridge. Indicated where the teeth incline toward each other.

Case No. 3: Replacing the lower posterior teeth, using the crib clasp on the first bicuspid and the ready-made lingual bar. A successful case without crowning.

Case No. 4: Replacing the upper posterior teeth, using two forms of ready-made attachments, and the palatal bar, showing vulcanite attachment of teeth. Indicated where there are no posterior teeth in the upper jaw.

Case No. 5: Replacing the bicuspids with Peeso jacket crown on the first molar, and the Peeso split tube with inlay in the cuspid. The abutment teeth for this type of bridge must be in perfect condition.

Case No. 6: Replacing the lower posterior teeth with a Peeso jacket crown on the first bicuspid, vulcanite attachment for the teeth, and the ready-made lingual bar.

As was said before, this is exacting work, and if you are not large enough to be the master mind, not a mere technician, in other words, if you can't deliver the goods, for the sake of your profession, don't load them in the cart. Be careful of the borderland between the fixed bridge and the removable bridge. Encourage the young dentist in your community. Send him some of your excess patients; this will carry him through the training period, and some day he will travel on the big circuit.

Dental Surgery in the German Army

The *British Medical Journal* reports that at a meeting of surgeons and dentists held a few months ago in Berlin, General Schultzen gave an account of the organization of the dental service in the German army. The work fell into two main divisions—the treatment of wounds of the jaw, which was the most important, and the everyday treatment of soldiers' teeth, including the making and fitting of artificial teeth, to render the men fit for active service or employment on war duties. The incidence of wounds of the jaw had, he said, far exceeded expectations, with the result that five dentists had to be attached to each army corps, although, under an arrangement made in 1907, only one dentist was provided for each. Dentists were appointed to military hospitals where adequate facilities were provided for skilled work, and were employed also to a certain extent nearer the firing line, when the fighting assumed a stationary character. In fracture of the jaw, the primary object of the dentist was to immobilize the fragments in order that the patient might be sent on at once to a special jaw hospital at home, where extensive operations could be undertaken. About 1,000 dentists were employed by the army on the lines of communication and at home. The organization had worked smoothly. It had been hoped that, owing to the supervision and treatment of school children's teeth, the teeth of the recruit would be found on the whole to be sound. But between the school age and the military age there was evidently time enough for neglect of the teeth to provide plenty of work for the army dentist.

GOLD CROWNS*

BY DR. P. A. GOULD, GIBSONBURG, OHIO

THE MAIN FEATURES of this clinic are illustrated in THE DENTAL SUMMARY of 1913. They are to show how to produce in the easiest manner possible a perfect fit at the cervical line, to correspond to teeth found in patients of advanced years, say past sixty, which will show a compound curve from above the gingiva to a concave below the gingiva and the cervical. This allows a recession in the enamel, in which the gum may lie and be protected by the contour above the gingiva. Crowns that may have a prominent contour at the cervical are like many teeth that are in the mouths of patients in what we may call abnormal conditions. You will find in many cases an exaggeration of this contour at the cervical. They are teeth where pyorrhea begins early in life, and not much evidence of tartar; very hard cases of pyorrhea to handle. Temporary teeth will show this contour the most in evidence, and if we make crowns with contour at the cervical, like temporary teeth, we will have temporary crowns, because we have produced a focus in which debris may be collected, and it is almost impossible to clean it out.

The principal thing to do in such cases is to prepare your tooth by grinding it in the form of a pyramid, with the corners rounded. On most teeth you have a perfect circle, with the exception that with some of the bicuspids you may find a greater extension at the buccal than the labial surface, and you may have to curve out for the proximal spaces. Measure just above the cervical line for the outside measurement of your band, then file the inside of your band so as to fit the taper at which you have ground the tooth. Place the band on root, and you can press to position without any danger of pushing over the cervical line. If there is any place where it does overlap, it will hurt the patient, and you know there is something wrong and can correct it. Make your band so that it fits tightly, without causing any injury to patient; then contour your crown with your pliers to fit the proximal spaces. Your band must be long enough to make your occlusion. If you want to make a solid cast crown, fill in with wax, carve it up and cast. You don't need two or three processes of pushing the wax down to get a tight joint. You already have a mechanically-made joint by your metal band outside. I wouldn't use less than 30-gauge gold to make my band, except on very small anterior teeth, where you might use 31 gauge.

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*Clinic, Ohio State Dental Society, December, 1916.

PRESIDENT'S ADDRESS*

BY O. A. VAN KIRK, D.D.S., KENDALLVILLE, IND.

IT IS A GREAT PLEASURE for me to open this, our 28th annual meeting, and bid you welcome. In preparing this program, it has been the desire of the officers to have prepared clinics and lectures to suit all, and I hope they have not spent their time and efforts in vain. In the first place, I wish to give credit for the program where credit is due. It has been the desire of Dr. Priest, who has so ably prepared the literary part of our program, to get men who are masters in their respective lines, to deliver to us papers and lectures on subjects that are of vital importance not only for the specialist or the man with the select practice who may carry out his theories, regardless of money, but to the interest and education of what I wish to term the rank and file of the profession.

Our superintendent of clinics is to be congratulated on the excellent clinics that he will have presented to us. It is my opinion that we cannot witness these clinics without gaining some new point of interest, which we may take home and apply in our daily practice, thereby serving those who place themselves in our care better than we did before.

Our executive committee is not to be forgotten for the efforts made by its members to arouse interest in their respective localities in order to increase the attendance at the meeting. The local society, which a year ago was unorganized, has selected an ideal place for our meeting. I wish to extend my thanks to you, one and all, who left your homes either last evening or early this morning in order that you might be present when the tapping of the gavel opened this meeting.

Last year when our meeting was over it was said, "It was the best meeting in the history of the society." When the meeting closes tomorrow afternoon, I hope the same may be truthfully said of this meeting. I hope that the same may be said of each succeeding meeting, and that there may be no limit to what we will do.

In order that there may be no disappointment, I will state right here that I do not wish you to have the impression that you are to hear a fine oratorical address, or a paper of a scientific nature that is too deep for many of you or myself to understand. I simply wish to mention a few things that we as dentists who have so much responsibility as to the future health, and I think that I may say the lives, of so many people in our care, should be more concerned about, and that we should make a deeper study of the calling which we have chosen.

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*Read before the Northern Indiana Dental Society, October, 1916.

First, let me mention a few things pertaining to the history of our profession. In age dentistry comes next to that of medicine, and there are some evidences that it even ante-dates medicine. We find the teeth of mummies filled and bridge work in the mouths of others. We have evidences of dentistry in this country previous to the coming of Columbus. A short time ago a friend showed me a lower partial plate which was carved out of bone by a man in New York City in the year 1791. Natural teeth were riveted onto the bone. About ten years after the plate was made, a second bicuspid and first molar were lost. A small piece of bone to which these teeth were fastened was riveted to the plate. This plate was worn till the year 1827.

In looking over some dental journals of 1860-80, I find these subjects discussed: Should amalgam and gold be placed in the same mouth? If the nerve of a deciduous tooth is devitalized, will the permanent tooth erupt? At this time we had many good men working on histology, pathology, bacteriology and therapeutics.

Twelve years ago when I graduated from college, the gold inlay was not thought of. The porcelain inlay was then in its zenith and it was at that time thought that it would soon displace the gold filling. But it fell from its lofty position as fast or faster than it ascended, but I consider the time spent in trying to perfect it not wasted, for it left with us the porcelain jacket crown, which I think it would be well for more of us to become familiar with. Other improvements that were not then thought of and that have proven practicable, are: removable bridge work, the silicate cements, nitrous oxid and oxygen, conductive anesthesia, desensitizing pastes, Gysi method of selecting teeth, the closed-mouth impression, the advancement in the treatment of pyorrhea. In college our professor of operative dentistry told us the best thing for pyorrhea that he knew of was to extract the teeth. Now, by careful treatment, we are able to save the teeth for years, that would otherwise long ago have been consigned to the forceps. New methods in the treatment of root canals and the filling of same, are filling a long-felt want.

Some time ago I heard a specialist say that fully eighty-five per cent. of devitalized teeth abscess some time or other. While this percentage seems very high, it is not so hard to believe when the dental X-ray is turned onto some of our imperfect canal work and shows many mouths that we thought in perfect condition as harboring blind abscesses, discharging pus into the blood, carrying this infection to all parts of the body.

In my opinion the X-ray, as applied in our work, is the greatest single advancement that we have made in the past ten years, and it is my belief that in the next three to five years the dentist who does his canal work in the dark without the use of the X-ray will be considered by the public not a modern dentist.

Ten years ago it was conceded by the profession that dentistry had made more advancement in the past twenty years that it previously had in its entire history. Who of us can estimate what it will be in the next fifteen years? I think our methods will be changed and that we will be doing work then that we do not even dream of. The public, as a rule, want and are demanding the best that the profession can give. As often has been repeated, one of the Mayos has said the next great step made in preventive medicine will be taken by the dentist. Many physicians are awakening to the importance of the teeth and their relation to systemic diseases, and a dentist stated to me some time ago that when a patient went to a physician for treatment, the first thing the physician asked was to let him see his teeth. If he saw a black spot on any of the teeth, he said: "Go to your dentist; your teeth are causing your trouble." Physicians realize the importance of the teeth more today than they ever did before, and are sending us a vast amount of work that otherwise we would not see until the teeth would have to be extracted. Prominent educators are beginning to realize the value to the child of good teeth and a clean and healthy mouth. There are many magazines of which it is quite impossible to find a single copy without some article concerning the teeth. Even the government itself is promulgating a movement in many cities and towns to establish what is known as health week, in which the care of the teeth has a prominent place. The manufacturers of dentifrices are doing a great work toward educating the people to better care of the teeth.

It is the claim of the advertising dentists that their object of organization is to educate the public. They have now organized and call themselves the "Modern Ethical Dental Society." It is their plans to increase their advertising and to obtain a place on our State Board for one of their men. This organization (if I may use the expression) is going to make the ethical dentists sit up and take notice. An organized effort should be made by us to combat this organization and to see that our laws are not repealed, but instead to gain better laws and properly educate the public.

With the combined efforts of these different forces, there is going to be a much increased demand for good dental work. The question is: "Are we going to be prepared to meet this demand?" As I can see, there is only one answer: *We must be prepared.*

Dr. Best, of Minneapolis, has said that the dentists have now reached their crisis and are today passing through the most revolutionary epoch in the history of dentistry. In this he refers to our imperfect canal work, which he says is causing as much or more suffering than any other operation. It is my opinion, as I stated before, that the X-ray is coming to us very soon and is even now being demanded by our better educated class of patients.

We must not lose any opportunity to better ourselves in all branches of our profession. We have, almost at our doors, the best post-graduate courses that one could ask for. I refer to dental society meetings. We have a state society that ranks among the best in the United States, the meetings of which I do not see how any dentist can well afford to miss. In a short time our state will be covered by component societies, which in themselves are stepping-stones to better dentistry. We are fortunate in being located near the city of Chicago where, with but little time and expense, we may frequently witness clinics and hear papers by men of wide and varied experience.

Last but not least, we have our own society, which has done a great and good work in the twenty-eight years of its existence, and is open to the non-ethical as well as the ethical dentist.

We can have, for the price of one dollar per year, most any of the best dental magazines that are both interesting and instructive from cover to cover. Who is there that can afford to be without three to six of these magazines, not to put in a bookcase or laid on the reception-room table, the main object to be seen by the patients, but to be read carefully by the dentist.

A dentist who held the respect of the people in his community, and who had made a financial success, was asked to what he attributed his success. To this question he replied that among other things he attended and paid close attention to the lectures, discussions and clinics of dental society meetings, and read a number of good dental magazines, laying special stress on the word *read*.

It is our own fault if we do not reap the harvest that is ours. We should not hear a paper or witness a clinic and say that it was very interesting, or it was fine, and let that be the end of it; but we should go home and apply it in our own offices. Of course, we may not have the success at first that we think we should, but by persistent effort we will be able to get satisfactory results.

A short time ago a friend in a neighboring city, in speaking of his dentist, said he would have to change dentists as his dentist never attended a dental meeting, and it was his belief that he did not take a dental magazine, as he always found him reading some other periodical than dental literature when he entered his office. He said he considered him in a rut. This was a business man not above the average intelligence. This dentist had graduated from college nine years ago. Think of it! A dentist being out of college nine years and considered *in a rut* by one of the laity!

We should still consider ourselves students and in school, and have our regular hours for study. It is said of Dr. Black that he would go to his office one hour before his first patient was due and lock his door and spend the time in study. He soon found this time not long enough. He added one and then two hours to this time for study. Only by hard and persistent study has he been placed in the position that he has attained. I know of a dentist who has set aside a certain evening of every week for the reading of dental literature. He rarely lets anything interfere with this study evening. If such is the case, he takes another evening so that he does not fail to put in so much study each week. This seems to me a very good method. We will get out of our profession no more than what we have put into it.

In conclusion, I wish to read to you some poetry which most of you no doubt have read, found on the cover of our state bulletin:

If you think you are beaten, you are;
If you think you dare not, you don't;
If you'd like to win, but you think you can't,
It's almost a cinch you wont.

If you think you'll lose, you're lost,
For out of the world we find
Success begins with a fellow's will—
It's all in the state of mind.

If you think you're outclassed, you are;
You've got to think high to rise;
You've got to be sure of yourself before
You can ever win a prize.

Life's battles don't always go
To the stronger or faster man;
But soon or late, the man who wins
Is the man who thinks he can.

REPORT ON PRESIDENT'S ADDRESS

Your committee begs leave to submit the following report:

After a careful perusal of the address presented in the opening session by President Van Kirk, we are convinced that it is the culmination of much thought and effort expended in the preparation for this splendid meeting. He has concisely reviewed conditions in our profession's methods of past years, and adroitly led up to and pointed out the remarkable achievements of the present.

His address placed our minds in a receptive mood for the feast of good things offered us in the following sessions of this meeting.

We recommend that every dentist present give most serious thought to the suggestions offered, by which means we may individually better ourselves and raise the standard of service to the public.

Study clubs should be organized in many parts of the state as the most effective means of producing "Better Individual Dentists."

We recommend a continued and even closer co-operation in the great upward strides being made through the state association, and would pledge our support in these movements to the end that Hoosier dentistry may ever be a thing that will draw admiration and envy from neighboring states.

We recommend closer attention to school inspection and free clinics in communities where such work has not been undertaken.

To all the exhibitors and other non-members we extend our appreciation and thanks for what they have done to add to the success of the meeting.

To Mrs. William H. Herriott & Son special thanks should be given for the close co-operation and assistance rendered our committees.

To Purdue University we recommend thanks for having sent Miss McNeil, whose demonstration to the ladies proved so interesting.

To the dentists of Howard County and their ladies most cordial thanks are due for the manner in which they have so successfully anticipated and provided for our comfort and entertainment.

That our members' wives attend in such numbers is a matter of much gratification. Their gracious presence adds much to the pleasure of the meeting.

Respectfully submitted,
Robt. Gillis, *Chairman*,
J. C. Lavengood,
H. F. Gravelle.

PREPAREDNESS LEAGUE OF AMERICAN DENTISTS CLEVELAND UNIT IS MAKING HISTORY

ON MONDAY, March 5th, 1917, the proposition of the Preparedness League of American Dentists was presented to the council of the Cleveland Dental Society by Dr. F. M. Casto. By resolution of that body, the matter was referred to the society. The Cleveland Dental Society then authorized the president to appoint a committee of five to investigate the value of the League, and if in the committee's judgment advisable, the committee was directed to organize a unit of the league in Cleveland. The president appointed the following committee on organization: Drs. F. M. Casto, chairman, H. C. Kenyon, Frank C. Acker, W. C. Stillson and E. L. Pettibone. The committee, after careful consideration of the subject, decided that a unit should be organized in Cleveland. A special meeting was therefore called on April 2d, 1917, for the purpose of formally organizing the Cleveland unit. A joint dinner was held by the Western Reserve Alumni Association and the Cleveland Dental Society, which immediately preceded the evening meeting. Dr. S. M. Allen presided as toastmaster. He turned the meeting over to Dr. H. R. C. Wilson, president of the Cleveland Dental Society, who announced that Dr. F. M. Casto, chairman of the organization committee, would conduct the evening meeting.

Dr. Casto: Mr. President, Ladies, Gentlemen and Distinguished Guests: I assure you that it is a great privilege to be here, and to have the opportunity of presiding over such a meeting and at a time when our country is on the verge of a great crisis. At eight o'clock tonight President Wilson is to deliver his speech to Congress, which virtually means "The Declaration of War Against Germany." Tonight, therefore, will mark an epoch in the history of our country and of our profession. The Preparedness League of American Dentists is under the direction of a National Organization Committee of the National Dental Association. The organization of the Ohio Units will be under the direction of the officers of the Ohio State Dental Society. In order that you may know what is to be done throughout the United States by the Preparedness League of American Dentists, I will read a resume of its work which I have just received from Dr. J. W. Beach, of Buffalo, Chairman of the National Organization Committee. You will find a complete description of the plan of organization in the February number of the National Dental Association *Journal*. It certainly is a very great pleasure and honor to have with us tonight such distinguished guests. Permit me to present to you the Hon. Myron T. Herrick, Ex-Governor of Ohio and former Ambassador to France. It was largely through the efforts of Governor Herrick that the American Ambulance Hospital in Paris was founded. He has always been and is now one of its most ardent supporters and friends. He was entirely responsible for the organization of the dental department in the American Ambulance.

GOVERNOR HERRICK:—(Address will be found on page 397)

DR. CASTO: I wish to say, Governor Herrick, that every man and woman present appreciates deeply what you have said. You have delivered to us a most wonderful speech upon a most unusual occasion. What you have said is of great significance and of great importance to the dental profession of America, and on behalf of those present I wish to extend to you a vote of thanks for giving us of your time and knowledge.

GOV. HERRICK: Thank you very much for your appreciation.

DR. CASTO: We have with us another distinguished guest, Major P. S. Bond*. Major Bond is a graduate of West Point, and has been in the service of his country twenty-one years.

DR. CASTO: We expected to have with us tonight two other eminent surgeons, Dr. G. W. Crile and Dr. W. E. Lower. Unfortunately, both of these men were compelled to be absent from the city. However, each wrote a letter to me, which I will read at this time. Drs. Crile and Lower served in the American Ambulance in France with the Western Reserve Unit.

COPY OF DR. CRILE'S LETTER

Dr. F. M. Casto, Rose Bldg., Cleveland, Ohio.

Dear Dr. Casto: As you know, I am exceedingly glad your profession is organiizing for military work. Two years ago when I was with the American Ambulance in France, I was constantly in touch with the work done by the dental surgeons, and could not but be impressed with the wonderful results attained by them and the surgeons working together. The type of warfare today makes the need for jaw repair work very urgent.

I need not tell you that organization for military service is timely, or that I wish for you the best of success in this project.

Sincerely yours,

(*Signed*) G. W. CRILE.

COPY OF DR. LOWER'S LETTER

Dr. F. M. Casto, 458 Rose Bldg., Cleveland, Ohio.

Dear Dr. Casto: I regret very much that absence from the city will prevent my attendance at the meeting of your profession to organize for military work.

During my work with the wounded soldiers in the American Ambulance, I was greatly impressed with the work done by the dentists and by what they were able to do for many of those injured jaws, especially when working in co-operation with the surgeons. The trench warfare over there and the extensive use of high explosive shells make head injuries, especially injuries of the jaw, very common. The splendid results obtained in the treatment of these cases is largely due to the work done by the dental surgeons.

I think this is the time to organize your profession for such an emergency. In case of hostilities you will be greatly needed; and I need not tell you that to do the work most effectively it is necessary to have an efficient organization.

Very sincerely yours.

(*Signed*) WILLIAM E. LOWER.

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*Major Bond's address will appear in the July DENTAL SUMMARY.

We certainly appreciate the recognition given the dental profession by these great surgeons. They are both familiar with the wonderful work that has been done by Drs. Hayes and Davenport in the American Ambulance, and I think every person here thinks better of his profession and of himself since this work has been done. I will now ask Dr. H. C. Kenyon to outline briefly the work of the Cleveland Unit, after which we will view the War Surgery Film, which has been sent to us from Philadelphia. This film did not arrive until six o'clock, therefore, it has not been censored by the Ohio Board of Censors or by your committee. We are not responsible for what it may be; we are only responsible for its being here.

Dr. Kenyon: One of the requirements of military service is endurance, and I am sure we are all qualifying tonight by enthusiastically sticking through this long program. I wish to announce that while my speech is the last one, it is not by any means the least important part of this program. I will make my explanation just as brief as possible.

This is the first meeting. There will be many more; I trust that your interest and loyalty will continue. In the first place, the Preparedness League of American Dentists is not a military organization. It is a Preparedness organization. It is to prepare us to do such duties as we may later have to face. One remark that Dr. Bunts made impressed me, and that was his statement that no mobilization of this kind has appeared in the medical profession in this vicinity at this date. I am glad he is here with us tonight to give us his support, but I would say furthermore, if we have the medical profession beaten at this stage of the game, we are not through with them yet. We are only getting started now. We are going to call upon the medical profession of this city for assistance very frequently in the meetings of this league, and shall be very glad to co-operate with them in their preparedness work. In the city of Cleveland we have some of the most capable dental surgeons in the world, and this gathering of approximately three hundred is a fair representation of the profession in this district. And yet, probably, we have not ten men in this room tonight who can go into a Base Hospital in time of war and do the required work. We have never been required to do that kind of work. We have the education and the technical skill, but we lack the necessary special training for such service. As citizens of the U. S. A. there is nothing that we possess that does not belong to our government at any time our government needs it. The American people never yet have failed to respond to the call of duty, but we do not wish to misplace the energies of our people who have special skill and special talents along certain lines. We do not wish to waste that talent in some other line of service that will be of less value to the government. Joining the League does not put upon any man who joins it an obligation to join the military forces of the country. It does give an opportunity to be prepared for the time when our government calls upon us for special service which we are due to render to the government. We wish when we are called, if we must be called, to be able to render the maximum of efficiency in service and to that end the League proposes to start study classes and to organize upon such a basis that we will have practically a post-graduate school in oral surgery going on in Cleveland within a very few weeks. Lest I shall talk too long and tire you, I will come directly to the main business ot the evening, which is the organization of the Cleveland Unit, and in order to present this in a suitable form, I have written it out.

Your committee has been industrious and has spent a great deal of time making as thorough an investigation as possible, and we submit these recommendations believing they are the best obtainable for the present. They may be changed at such time in the future as new requirements develop. In the attached proposition we propose to have certain divisions relating to various divisions of the practice of dentistry and oral surgery. At the head we will have men who are particularly prepared along these lines. The League will be the school; these men will gather together such information as is available both here and in Europe.

Complying with our instructions from the Cleveland Dental Society, the organization committee of the Cleveland Unit of the Preparedness League of American Dentists has made, we believe, a thorough investigation and prepared tentative plans for the organization of this Unit, and begs to present its recommendations in the following resolutions:

RESOLUTIONS

Whereas, The surgical history of the present conflict in Europe has demonstrated the imperative need of the trained dental surgeons to co-operate with the general surgeon, and

Whereas, While in the ranks of dental surgeons of America there are many men of wonderful skill and great attainment, there are still comparatively few who are trained to meet the special demands of war dental surgery; therefore,

Be It Resolved: First, That the Cleveland Unit of the Preparedness League of American Dentists be now formed; and,

Second, That the officers shall be a Chairman, Vice-Chairman and Secretary-Treasurer; and,

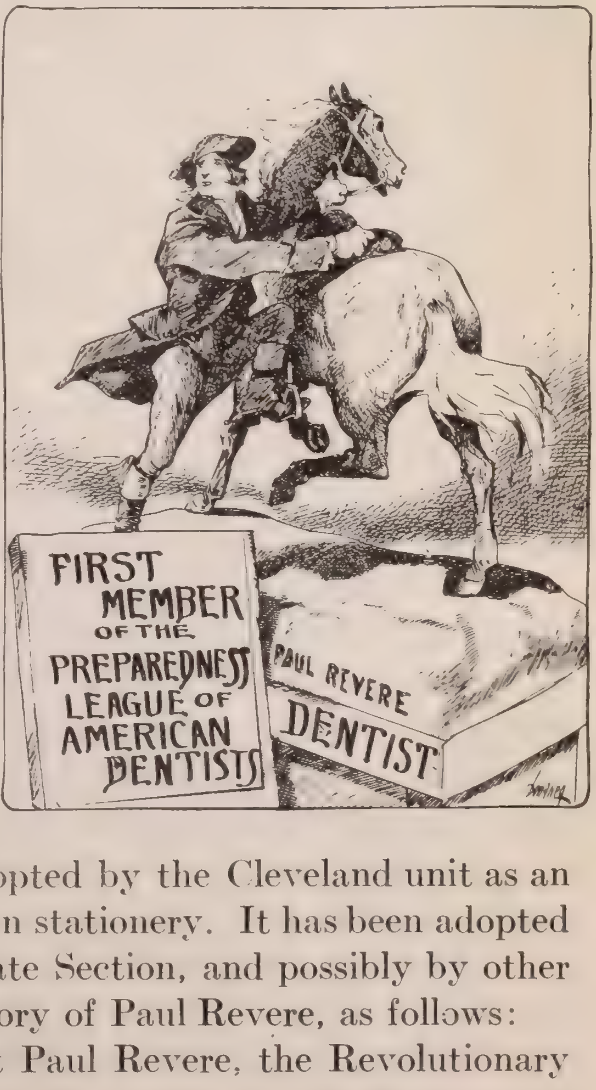
Third, That the Unit, being under the auspices and authority of the Cleveland Dental Society, the President and Vice-President of the Cleveland Dental Society become automatically Chairman and Vice-Chairman of this Unit, and that a Secretary-Treasurer be elected by the active members of the Unit; and,

Fourth, That at least two members be elected to head each division; and,

Fifth, That a meeting of this unit be called for 7:30 P.M., Thursday, April 5th, at Hotel Statler, for the election of officers, divisional heads, and such other business as may be necessary; and,

Sixth. That the President of the Cleveland Dental Society appoint a committee on Constitution and By-Laws to report at that meeting.

After the adoption of the resolutions, Dr. Wilson, president of the Cleveland Dental Society, appointed as a committee on constitution and by-laws Drs. Casto, Kenyon, Stillson, Acker and Pettibone. Dr. Casto then called upon Dr. Ambler, who recited a poem by John H. Payne, entitled "The American Flag." Then came a surprise which met with instant spontaneous applause, when the Paul Revere slide was thrown on the screen. This was the result of a happy thought of Dr. H. C. Kenyon, who, remembering that Revere was a dentist, recognized the possibilities in the picture when it appeared in the *Cleveland Plain Dealer* with another inscription. The generous consent of the eminent cartoonist, Mr. J. H. Donahey, was readily secured by Dr. Casto, the necessary changes were made and the slides were then produced. The enthusiasm with which it was received by the three hundred dentists present was such that it was adopted by the Cleveland unit as an emblem, and plates were made to be used on stationery. It has been adopted by the national organization, the Ohio State Section, and possibly by other units. Then Dr. Ambler gave a brief history of Paul Revere, as follows:


FIRST MEMBER OF THE PREPAREDNESS LEAGUE OF AMERICAN DENTISTS
PAUL REVERE DENTIST

It may not be generally known that Paul Revere, the Revolutionary patriot, besides being a gold-and silver-smith, expert worker in bronze and other metals, also practiced dentistry in Boston. In THE DENTAL SUMMARY of October, 1909, at page 769, appears an article by the speaker on "Early Dentistry in America," which contains a history of Paul Revere as a dentist. Among his many other accomplishments, he practiced making artificial teeth and evidently learned this work from one John Baker, surgeon dentist. In the *Boston Gazette* for December 26th, 1768, there appears the following: "Whereas, so many persons are so unfortunate as to lose their fore teeth by accident, and other ways, to their great detriment, not only in looks but speaking, both in public and private; This is to inform all such that they may have them replaced with artificial ones that look as well as the natural, and answer the end of speaking to all intents, by Paul Revere, goldsmith, near the head of Dr. Clarke's wharf, Boston. All persons who have had false teeth fixt by John Baker, surgeon dentist, and they have got loose (as they will in time) may have them fastened by the above (who learnt the method of fixing them from Mr. John Baker)." Revere lived on Fish street and carried on the business of goldsmith, silversmith, engraver and dentist, so far at least, as to make and set artificial teeth, then called a new invention, The Granary burying ground in Boston was established in 1660, and here is interred the ardent patriot and ingenuous mechanical artist, the messenger of the midnight ride, immortalized by Longfellow. The inscription on his headstone is as follows:

* *

PAUL REVERE
BORN
IN BOSTON
JANUARY, 1734
DIED
MAY, 1818.

* *

Following this some motion pictures presenting a phase of war surgery and trench life in the present European War were presented.

On the evening of April 5th, the Cleveland Unit met in the library of the Statler Hotel to hear the report of the Committee on Constitution and By-Laws, and to elect officers. The committee having been unable to arrange a meeting, Dr. H. C. Kenyon drew up a constitution which the committee presented and the unit adopted. This constitution has been used as a model by the Ohio Section Organization Committee, and we believe is being recommended by the National Committee at Buffalo for use in local units. It at least has the merit of being short and definite:

Following the adoption of the constitution, the officers were elected as follows: H. R. C. Wilson, president of the Cleveland Dental Society, and Guy Dudley Lovett, vice-president of the Cleveland Dental Society, automatically became chairman and vice-chairman of the unit. J. V. Gentilly, 815 Schofield Bldg., was elected secretary-treasurer. H. C. Kenyon, D. H. Ziegler and J. F. Stephan were elected to complete the executive committee. Leaders of study divisions were also elected, which included the following men: D. H. Ziegler, W. C. Stillson, F. M. Casto, V. E. Barnes, J. P. Henahan, E. B. Lodge, S. M. Weaver, H. H. Dowd, J. H. Hood, A. I. Brown, D. E. Sheehan and C. K. Teter.

The next meeting at the Hollenden Hotel, April 12, 1917, initiated the educational program of the unit with an illustrated lecture on War Dental Surgery in France, by Dr. Bernard B. Neubauer, who was at the American Ambulance with the Lakeside unit from Cleveland.

Following this meeting Dr. Varney E. Barnes made a three-days' trip to Toronto, Canada, to study the organization and work of the Dental Corps of the Canadian army. His enthusiastic report to the Executive Committee resulted in the arrangement for an intensely interesting and instructive meeting at the Hollenden Hotel on Saturday night, April 21st, which did not break up until after midnight. This meeting was opened impressively by Cleveland Troop 65, Boy Scouts of America, marching entirely around the audience, at the call of their little but mighty bugler, who preceded the troop into the Assembly Room and, standing at the speakers' table, thrilled the audience and his comrades with a splendid performance with his bugle. Dr. L. L. Barber, president of the National Dental Association, made some introductory remarks, and cautioned us with some well-chosen words to "Keep our feet on the ground," and Dr. Casto added, "And keep them moving." Dr. H. C. Brown, of Columbus, chairman of the Legislative Committee of the National Dental Association, explained the Army Dental Law and pending legislation as related to dental service in the U. S. Army. The dental conditions in Canada and in the European War were explained by three Canadian dentists, who had been invited to come and give us their experience and suggestions to aid us in giving the best dental service to our country. These gentlemen from Canada reviewed the developments of the Canadian Military Dental Establishment, from the beginning of the war to its present efficiency. Dr. A. E. Webster, of Toronto, Dean of the Royal College of Dental Surgeons (now a military dental school), explained the operation of the military college and the part the civilian dentists took in endeavoring to serve their country. Col. Clayton, of Ottawa, and Major Thompson, of Toronto, who are serving in the Canadian Army Dental Corps, told what the Army Dental Service is doing to make the Canadian soldier efficient. In the course of his remarks, Major Thompson read a letter from Major General W. H. Logie, of the Canadian army, dated April 20th, 1917, from which the following is quoted:

"As you have asked me for an opinion on the necessity for a Dental Corps in the Army, and as to the benefit it has been to the Canadian Overseas Military Forces, I can answer in three words—It is indispensable. You yourself know how many men your clinic has rendered fit for service in this district, but the corps as a corps is necessary to properly administer and co-ordinate the dental service, and by it alone can the services of self-sacrificing dental surgeons be properly allotted to the particular posts where their training and experience will be of most benefit to the country and to the men who require treatment. I may say that it is acknowledged on all sides that the Canadian dental service is the best on the Allied side, and this arises not only from the superior training and education of Canadian dentists, but also because although not fully recognized, the formation of a dental corps has put them in a position in which it is hoped their rightful status in the army will soon follow."

Other speakers were Captain S. D. Boak, M.D., D.D.S., Dental Surgeon U. S. Army, who emphasized the need of dental surgeons in the army, and the highly satisfactory relations existing in our army between the Army Medical and Dental Corps.

Dr. J. W. Beach, national chairman of the Preparedness League of American Dentists, spoke for a few minutes on the work and aims of the Preparedness League of American Dentists as a national body and its relations and services to the government.

On the whole, the subject of the discussion of the evening was national legislation, relating to the Army Dental Corps, and it is hoped much good will come from the free exchange of opinions on the subject from the various angles represented by the different viewpoints of the speakers.

The educational work will be continued for several weeks now, with the co-operation of Major H. L. Gilchrist, of the Medical Corps of the U. S. Army, who will lecture on Military Medical and Dental Service jointly to the members of the Cleveland Unit of the Preparedness League of American Dentists and the Medical League of Cuyahoga County, at the Cleveland Medical Library, on Tuesday evenings each week, until the course is completed.

The Executive Committee of the Cleveland Unit, through a sub-committee, has taken a census of Cuyahoga County dentists. At the last report from the Census Committee, forty-five men have offered to join the Reserve Corps and practically all have agreed to do such local service as may be called for.

This report of the work in Cleveland is made in the hope that it may stimulate action and assist in the mobilization of the dental profession throughout the nation, for any and all services required of it, and to the end that such duties shall be efficiently and *promptly* performed when called for.

A RESUME OF THE ORGANIZATION OF THE PREPAREDNESS LEAGUE UNITS IN THE STATE OF OHIO

THE NATIONAL COMMITTEE on Organization of the Preparedness League of American Dentists, J. W. Beach, chairman, Buffalo, delegated the organization of units in the State of Ohio to Dr. F. M. Casto, president of the Ohio State Dental Society. Dr. Casto, realizing the necessity for immediate and quick action, called the Ad-Interim Committee, Educational, Industrial and Oral Hygiene Committees and other prominent members of the society from various sections of the state, including Dr. L. L. Barber, Toledo, president of the National Dental Association, together at Columbus, Sunday, April 8th, and requested that the organization be placed under the supervision of the Ohio State Dental Society. This plan of organization was unanimously decided upon. The organizers were then selected to cover the various component societies in the state. Regular forms of letters and blanks were placed in the hands of each organizer, which was for the purpose of facilitating this work. The following are specimen copies:

OHIO SECTION
PREPAREDNESS LEAGUE OF AMERICAN DENTISTS

April , 1917.

Dear Doctor: Your country is at war and needs your services. The Preparedness League of American Dentists are organizing the Ohio Section, and as part of this section we are organizing a unit in your district.

The league is a civic organization and its purpose is to mobolize the dental forces of the country. Its only obligation is that its members will each care for the mouth of at least one recruit.

Throughout the country many organizations, commercial and professional, have already perfected the mobilization of their forces, and are offering their services to the country, and we must do the same.

Full details are to be found on page 176 of the February, 1917, number of *Journal of the National Dental Association.*

Please meet with me on.................................at....................... Your help is needed to organize this unit. If it is impossible to be present at this date please sign the enclosed application so that you may be notified of the next meeting of the unit which will be held very soon.

Yours fraternally,

....*Committeeman.*

APPLICATION BLANK
to the
PREPAREDNESS LEAGUE OF AMERICAN DENTISTS
3 Professional Bldg. 131 Allen St., Buffalo, N. Y.

I hereby make application for ACTIVE MEMBERSHIP in the Preparedness League of American Dentists, which entitles me to all the benefits and privileges of the organization.

Enclosed find $1.00 (One Dollar.) No dues or assessments.

Signed...............................

Please write name ....
and address plainly. ....

SPECIMEN
CONSTITUTION AND BY-LAWS
of
.........................UNIT

Preparedness League of American Dentists—Ohio Section

First: The name of the organization shall be the........................Unit of the Preparedness League of American Dentists.

Second: Purpose—To prepare its members by organization and training to render the most efficient service in Dental Surgery to our country in time of War and of Preparation for War.

Third: This Unit of the Preparedness League of American Dentists shall be a subsidiary of the...(Name of Component), and under its general authority.

Fourth: Any reputable member of the dental profession who is in good standing with the National Organization of the Preparedness League of American Dentists may become a member of this Unit by a majority vote of the members present at any regular meeting of the Unit.

Fifth: The officers of the Unit shall consist of a Chairman, Vice-Chairman and a Secretary-Treasurer, whose duties shall be the usual duties of such officers, except Secretary-Treasurer, whose duty it shall be to report once a month to headquarters, 131 Allen St., Buffalo.

Sixth: The President of the.........................(Component Society) shall be the Chairman of this Unit. The Vice-President of the........................(Component Society) shall be the Vice-Chairman of this Unit. The Secretary-Treasurer shall be elected by the members of the Unit, and shall hold office coincident with the Chairman and Vice-Chairman, or until his successor has qualified.

Seventh: The study and training of members shall be considered under the following divisions: Oral Surgery, Orthodontia, Radiography, Prosthodontia, Mouth Hygiene and Therapeutics, and such others as may be added by the executive committee of the Unit.

Eighth: A leader shall be elected to head each division. Vacancies in division leaders may be filled by the Executive Committee of the Unit subject to approval by majority vote of the members present at any regular meeting.

Ninth: Quorum.

Tenth: The Unit shall have an Executive Committee consisting of the officers and three members of the Unit elected by the members, whose duties shall be the direction of the affairs of the Unit, and whose acts shall be subject to recall by a two-thirds vote of the members of the Unit present at a regular meeting.

Eleventh: The Constitution and By-Laws may be amended by a four-fifths vote of the members present at any regular meeting, or by a two-thirds vote at the next meeting following one at which a proposed amendment has been read and placed on file with the Secretary.

Twelfth: The dues shall be voluntary contributions.

PREPAREDNESS LEAGUE OF AMERICAN DENTISTS
OHIO SECTION
Under the Supervision of
OHIO STATE DENTAL SOCIETY

Dear Doctor: In the present crisis our Government is in urgent need of men trained especially in their line of work to assist as officers in the Army and Navy. It is undoubtedly the desire of the Government to place men where their skill and equipment will be of the greatest value.

Dentists are eligible to enter the Officers' Reserve Corps, Dental Section. In making the inquiries that follow, it is the desire to learn how many are fitted for the work, and how many are willing to enter the service.

The officers of the Dental Reserve Corps, according to the National Defense Act of 1916, have the rank of First Lieutenant, and are appointed by the President. They must pass a physical, mental and moral examination prescribed by him to qualify to hold such commissions. The commissions are issued for periods of five years, at the end of which time the officers may be re-commissioned under such further examinations and qualifications as may be prescribed by the President.

The officers of the Dental Reserve Corps are subject for call for duty in time of actual or threatened hostilities only. While under active duty under such call, they are entitled to the pay and allowance, including quarters, fuel and light, of their grade. They are entitled also to pensions for disability incurred in the line of duty while in active service. They are not entitled to pay or allowance, retirement or retired pay, except when in active service.

Appointees must be citizens of the United States between twenty-two and fifty-five years of age; must be graduates of standard dental colleges, and must at the time of appointment be in active practice of their profession in the state in which they reside.

Applications for appointments in the Dental Reserve Corps must be made in writing, upon the prescribed blank form, to the Surgeon General of the Army, Washington, D.C., who will supply the blank upon request. Members of the League should apply to headquarters for application blanks and return them to us, when they will be forwarded to Washington. If you send them direct to the Surgeon General's Department, the following words should appear on the blank, "Member of the Preparedness League of American Dentists."

It is not supposed that every dentist will qualify for the Officers' Dental Reserve Corps. It is hoped, however, that a large number will be found among our membership. There will be much work for each of us to do, and it is the desire of your committee that you fill out the enclosed blank and return it as soon as possible.

Yours fraternally,

CENSUS COMMITTEE.

OHIO SECTION

"PREPAREDNESS" CENSUS OF DENTISTS—1917

Name........................Office Address..................Phone..........
Home Address................Phone...........
Age........................Married......................Children..........
How many years in General Practice?..
What have you specialized in?..
Have you ever had any training of a Military nature?.......................
Where?.......................When?...............What Rank?......
Have you any connections of a Military nature, and rank held in National Guard?
..............................Naval Reserve................Red Cross......
Under the call for Volunteers would you accept service in a dental capacity?........
Under which service would you prefer: Army—Navy—Red Cross?.............
Do you desire to join the Officers' Reserve Corps of the Army?.................
Do you desire to join the Officers' Reserve Corps of the Navy?.................
(No age limit. Rank and Compensation that of a First Lieutenant when called into Active Service.)
Do you desire to join the regular Dental Corps of the Army or Navy?...........
(Age limit, 32 years.)
How soon could you report for duty after accepting a call to Active Service?........
Under what conditions could you accept service if not any of the above?...........
....
If it would be impossible under any conditions for you to accept service, please indicate here...
Are you willing to give some time to the Government in preparing mouths of recruits to the Army or Navy?...
How much?..
Are you enrolled in the Preparedness League of Am. Dentists?..................
(Return to Census Committee or 460 Rose Bldg., Cleveland, Ohio.)

The organizers all agreed that within two weeks they would have league units organized in the component societies assigned them. This has been accomplished with one or two exceptions. At this time there has been a Preparedness League Unit organized in all the component societies of Ohio except five. The reason for this delay in most cases was that the members could not be conveniently called together at a special meeting in certain districts on account of the condition of roads, which makes traveling difficult. However, we expect that the organization will be complete by not later than the end of the first week in May. At the meeting in Columbus, the secretary of the Ohio State Dental Society was instructed to convey to the Hon. James M. Cox, Governor of Ohio, the action taken by the Ohio State Dental Society. The following is a copy of the secretary's letter to Governor Cox and Governor Cox's reply:

THE SECRETARY'S LETTER TO GOVERNOR COX

Columbus, Ohio, April 9th, 1917.

Honorable James M. Cox, Governor of Ohio, Columbus, Ohio.

Sir: At a special meeting of the officers and members of the Ohio State Dental Society, called by the society's president, in this city on April 8th, measures were perfected for the organization of Units of the Preparedness League of American Dentists. This work is to be completed within two weeks and will cover every city and considerable town in the state.

The chief object of this League is to offer gratuitous service to such applicants for enlistment as might otherwise be rejected because of oral and dental conditions.

A Unit will be organized in this city on next Thursday evening to whose members applicants for enlistment may be referred who are in need of such dental service as may be necessary to render them acceptable for enlistment. We desire to offer our professional services to our State and Nation with the highest of patriotic motives. Very respectfully,

(*Signed*) F. R. Chapman, *Sec.*,
Ohio State Dental Society.

GOVERNOR COX'S REPLY

Dr. F. R. Chapman, Sec. Ohio State Dental Society, April 10th, 1917.
305 Schultz Bldg., Columbus, Ohio.

My Dear Dr. Chapman: I am pleased to note the action taken at the special meeting of your society to perfect the organization of Units of the Preparedness League of American Dentists. Your members should deem it a high privilege to render service to the nation in this crisis by gratuitous attention to applicants for enlistment who might be rejected because of oral or dental conditions.

I want to congratulate you upon your patriotic motive. Very truly yours,

(*Signed*) James M. Cox.

The following men were appointed as members of the organization committee: L. L. Barber, Toledo; H. M. Semans, Columbus; E. W. Martindale, Columbus; H. C. Dean, Columbus; E. S. Braithwaite, Chicago Junction; J. K. Douglass, Sandusky; W. P. Stewart, Cincinnati; S. D. Ruggles, Portsmouth; Z. N. Wright, Dayton; H. C. Kenyon, Cleveland, T. I. Way, Cincinnati; Homer C. Brown, Columbus, F. R. Chapman, Columbus; E. C. Mills, Columbus; G. D. Edgar, Defiance; W. H. Hayden, Youngstown; Carl E. Smith, Akron; F. M. Purcell, Tippecanoe City; C. F. Mills, Chillicothe; E. E. Hall, Columbus; J. F. Stephan, Cleveland; J. E. Stuntebeck, Cincinnati; E. L. Pettibone, secretary, 6503 Detroit Ave., Cleveland, Ohio; F. M. Casto, chairman, 460 Rose Bldg., Cleveland Ohio.

The secretary of the Organization Committee was instructed to inform the Hon. Newton D. Baker, Secretary of War, of the action that was taken by the Ohio State Dental Society.

Census blanks were sent out for the purpose of determining the attitude of the dentists toward helping the government in this crisis. A very large percentage of the dentists throughout the state have signified their willingness to join the Officers' Reserve Corps, Dental Section. Arrangements are being made to supply all these men with blanks, but owing to the congestion of work at Washington, we have been unable to obtain anywhere near enough to supply the demand. This will be remedied very shortly, and the officers of the Preparedness League will be able to furnish any who desire application blanks for the Officers' Reserve Corps, Dental Section.

Many recruits are being prepared for services, patriotic meetings are being conducted all over the state, study clubs are preparing the men for better work which they will be required to do, and we hope each one will do their bit.

THE BACTERIOLOGY OF ALVEOLAR ABSCESS*

BY L. K. CANOUSE, M.D., ST. LOUIS, MO.

METHODS USED TO OBTAIN MATERIAL FOR BACTERIOLOGICAL EXAMINATION

A PIECE of 6 mm. glass tubing, six or eight inches long, is plugged at each end with cotton, sterilized one hour at 150° C., in the hot-air oven, and then drawn out into two capillary pipettes with sealed tips. This gives a pipette which is bacteriologically sterile on the inside, and the outside of the tip may be sterilized just before taking the culture by passing it through the Bunsen flame. After pus or fluid has been taken into the pipette, the material is drawn back about one-half inch from the tip and the tip sealed in the flame.

In acute alveolar abscess, the field to be incised is cleansed with fifty per cent. alcohol, and as soon as the incision is made the pipette is introduced deeply into the abscess, the pus collected and the tip sealed.

In chronic infections, the pus often is more difficult to obtain. Sometimes it may be taken directly from the pulp canals of teeth having no cavities of decay by washing the tooth with alcohol and opening the pulp chamber with a drill, when the pus may be taken up into the pipette.

Teeth may be extracted under aseptic precautions and the pus collected from the apices. Also the teeth may be flamed, wrapped up in sterile gauze, crushed between the jaws of a vise and cultures taken from the pulp and root canals.

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*Read before the St. Louis Society of Dental Science.

In fairly large abscesses with sinuses a culture may be taken after the greater part of the pus has been allowed to flow out.

If the dental surgeon has at hand a number of the pipettes described above, he will find that it is very easy to secure satisfactory specimens from the majority of acute and chronic alveolar infections.

CULTURAL METHODS

All of the culture media used is prepared from veal infusion instead of using the commercial extracts of beef. The reaction is titrated that it is 0.5% acid to phenolphthalein.

The specimen which has been received from the dentist sealed in the capillary pipette is opened in the following manner: The outside of the tip is sterilized by rubbing with the red hot ends of a pair of forceps, the tip crushed between them and the pus washed out into one-half cc. of broth and thoroughly mixed. Cultures are now made in four different ways, using one-fourth of the broth suspension for each:

1. Aerobic blood-agar plates. Three agar tubes containing 10cc. each are melted, cooled to 50° C., and 10 drops sterile defibrinated human blood added to each. One-fourth of the broth suspension is added to the first, three loops of the first to the second, and three loops of the second to the third. Then each is poured into a Petri dish. This gives three dilutions, one of which will give well-isolated colonies.

2. Anærobic blood-agar slants. One-fourth of the broth suspension is inoculated into two blood-agar slants, the corks are flamed, pushed down about one and one-half inches from the top, about one inch of pyrogallic acid and two or three drops of ten per cent. sodium hydrate added, and the whole sealed with a paraffin cork.

3. Ascitic dextrose broth. One-fourth of the broth suspension is added to a tube containing about 10 cc. dextrose broth, mixed with about 3 cc. of sterile ascitic fluid.

4. Ascitic dextrose agar shake cultures. Tall columns of dextrose agar are melted, cooled to 50° C., and one-third by volume of sterile ascitic fluid added. One tube is inoculated with one-fourth of the broth suspension and the second tube inoculated with four or five loops from the first. They are well mixed, but are incubated in the tubes.

These methods, I think, are the best which modern bacteriology affords. For them I am indebted to Dr. A. M. Moody, director of the National Pathological Laboratory, of Chicago, and pathologist of St. Lukes Hospital. I am also indebted to Dr. T. L. Gilmer, of Chicago, for the methods for obtaining material for examination.

CASE REPORTS

I wish to present to you two cases of alveolar abscess. In the first one I will show you the radiograph of the abscess and the cultures of the pus obtained from it. It is an example of alveolar abscess without systemic involvement. In the second one I have the radiograph of the abscess and cultures from the circulating blood showing systemic involvement.

Case 1: The pus from the alveolar abscess was secured in a pipette by Dr. Funkhouser from one of his patients, and inoculated into culture media yesterday and allowed to incubate twenty-four hours. The first dilution on the blood-agar plates shows about one hundred colonies of streptococcus viridans and fifteen colonies of streptococcus hæmolyticus. The other dilutions, of course, none. The first dilution in ascites-dextrose agar shows about the same number of colonies in the same proportion. The ascites broth has a heavy precipitate of clumps of streptococci with the supernatant fluid clear. The anærobic cultures show no growth on the surface and some sediment in the condensation water. It usually takes about five days to get a good growth of anærobic organisms. These findings are typical of chronic alveolar abscess. In acute abscess the hæmolytic streptococci usually predominate.

Case 2: History—Dr. Boemer, an interne in St. John's Hospital, St. Louis, injured his wrist while boxing. The radiograph showed no broken bones. Within forty-eight hours the wrist was greatly swollen, hot and painful. His temperature ranged between 99 and 101. Within another forty-eight hours the elbow above the wrist, the knee and ankle on the same side and the knee on the opposite side became involved. A diagnosis of an infectious polyarthritis was made and a blood culture was taken and cultures made in four ways, as outlined above. A pure culture of streptococcus viridans was obtained. Within two weeks the infection subsided and the doctor is apparently well at the present time.

After a careful examination the only focus of infection found was an abscess in a neglected tooth. As a matter of fact, when the diagnosis was still in doubt before the blood culture was taken, I suggested that streptococcus viridans would be the organisms found in the blood.

I consider that this is an example of systemic infection produced by an organism of low virulence, which was unable to affect the tissues while they were intact, but after multiplying in an injured joint, could then infect some of the others.

By these two cases I have tried to show that the methods given are applicable to every-day work, and if used by the dental surgeon are capable of giving accurate and reliable information.

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Lesions in Rabbits Produced by Streptococci from Chronic Alveolar Abscesses, A. M. Moody, *Jour. Infectious Diseases*, Vol. 19, No. 3, Sept., 1916, pp. 515-525.

ORAL SURGERY
CASE REPORTS

CONDUCTED BY HUGH W. MacMILLAN, D. D. S., CINCINNATI, OHIO

THIS DEPARTMENT AIMS TO REPORT INTERESTING ORAL SURGERY CASES IN BRIEF FORM, ILLUSTRATED BY RADIOGRAPHS AND PHOTOGRAPHS WHERE POSSIBLE. ARTICLES FOR THIS DEPARTMENT MUST NOT BE MORE THAN 500 WORDS IN LENGTH. SEND CONTRIBUTIONS TO DR. HUGH W. MACMILLAN, UNION CENTRAL BUILDING, CINCINNATI, OHIO.

Case I.—Double Dislocation: This case is presented more to show the beautiful X-ray plates than for its clinical value. The patient was gargling her throat with an antiseptic solution when suddenly both condyles became dislocated. This had occurred three times previously. Her physician tried to reduce the dislocation but failed and administered ether the following day, again failing to return the jaw to its normal relation. The dislocation was finally reduced by Dr. J. N. Myers, of the Ohio College of Dental Surgery.

The plates clearly show the anatomical landmarks in the base of the skull, the olivary eminence, sella turcica, dorsum sellæ, sphenoidal sinus, eminentia articularis, glenoid fossa and tympanic plate. The condyle can be seen resting on the anterior aspect of the eminentia articularis.

Case II.—Cyst of the Mandible: Mrs. S., age 46, referred by Dr. M. W. McIntyre, presented with a large mucous-lined cavity located between the external and internal plates of the mandible. The cavity was open above and was filled with a straw-colored mucilaginous fluid. The patient gave a history of having the teeth extracted eighteen years ago, the jaw never having been well since. Radiographs were made to outline the extent of the cavity. A root was found in the posterior part of the cavity and necrotic bone in the anterior part. An operation removing the root and necrosed bone was performed. The cavity was packed for a few days and afterwards was kept syringed out by the patient. The cavity rapidly filled with granulations.

Case III.—Cyst of the Ramus: Miss F. F., age 21, referred by Dr M. E. Beinhardt, presented with a badly swollen jaw in the region of the angle and extending up into the temple. The swelling was very tense and "crackled" on percussion. The patient gave a history of having the lower third molar filled when something "popped" and then her jaw began to hurt. The following day the jaw was badly swollen. Radiographs were made and the lower molars were found to be devital. These were extracted and the cyst drained through the enlarged alveoli. Following this an operation was performed from the outside, cutting back the walls of the cyst and curetting the interior. The wound was drained into the mouth and healed with remarkably little deformity.

(Cases presented by Dr. Hugh W. MacMillan.)

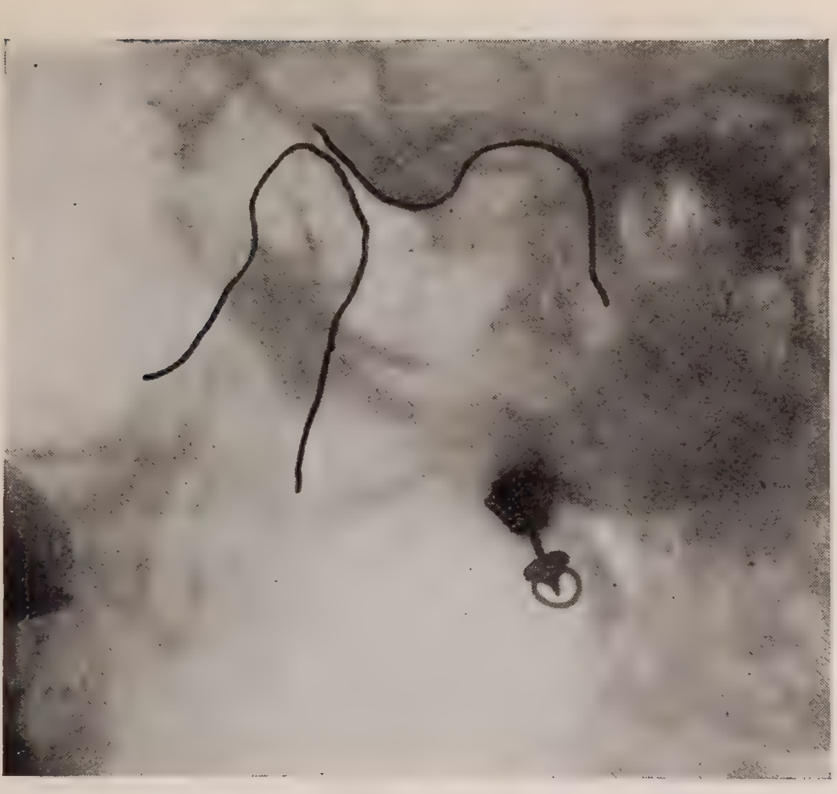

Fig. 1—Case I. The right side

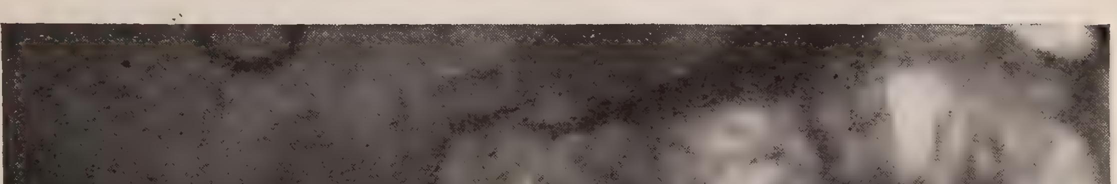

Fig. 2—Case I. The left side

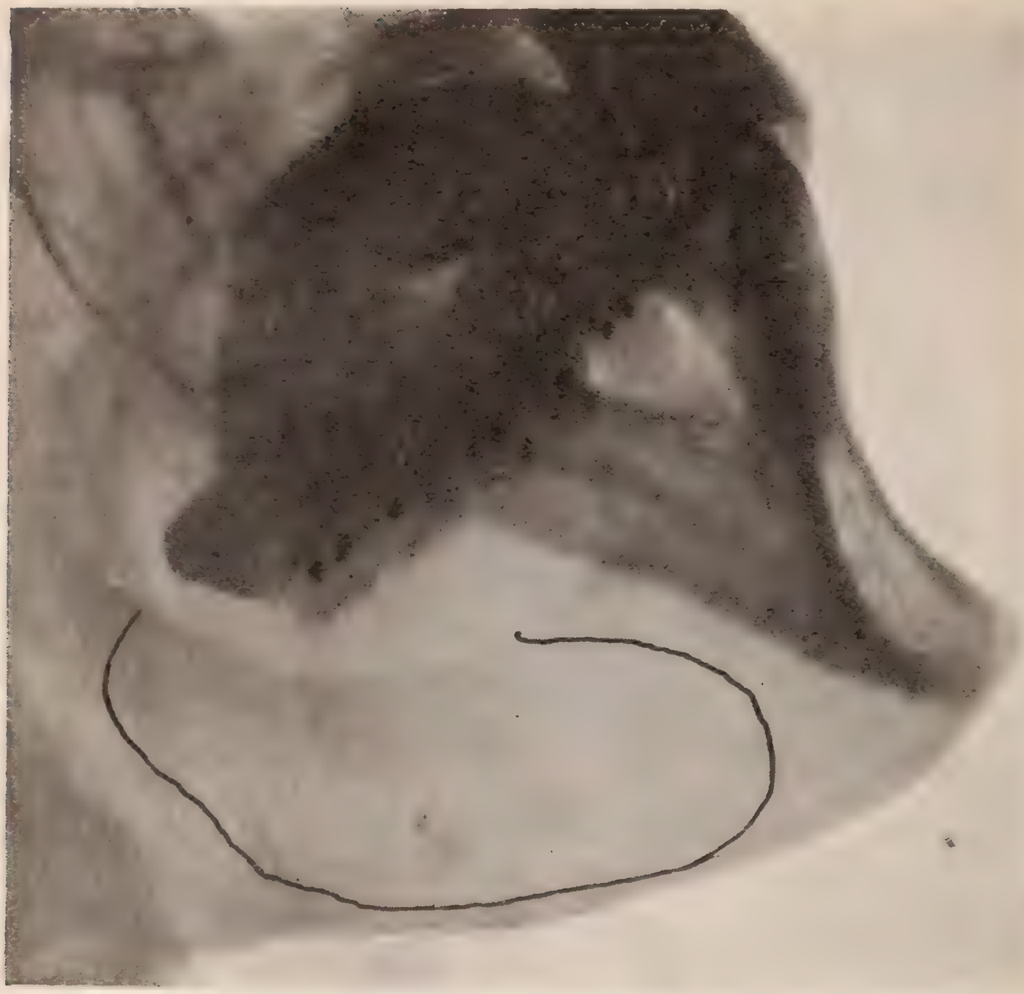

Fig. 3—Case II The outline of the cyst

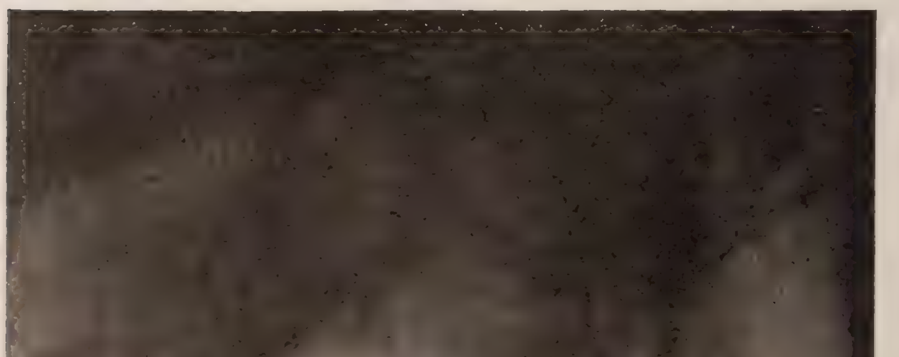

Fig. 4—Case III. Cyst of the Ramus

SUGGESTIONS

Conducted by F. R. Chapman, M.S., D.D.S., Comumbus, Ohio

(To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Bldg., Columbus, Ohio.)

The Dentist's Hands

Has any dentist made use of the engine, with Moore's discs, fine carborundum stones, for manicuring his nails? The discs suit the shape of his nails and take away all surplus growths, etc., and produce a beautiful polish, especially if used with fine pumice and glycerine.—

—*R. A. Leeder, Commonwealth Dental Review.*

To Make Rubber Tubing Pliable

When rubber tubing or dental rubber becomes stiff and hard to work, it may be very easily renewed or made pliable by placing it in hot water that contains about ten per cent. glycerine. This in no wise alters or damages the rubber or vulcanite.—*Pacific Dental Gazette.*

Removing the Teeth from an Old Denture

Prepare a fifteen or twenty per cent. solution of glycerine and water, bring this to the boiling point and place the denture in it. Boil for a few minutes and the teeth may be pushed off, leaving the pins clean and the teeth uninjured.—*Pacific Dental Gazette.*

Paraffin Root Filling

Paraffin is indicated in large canals where a hot instrument may be freely carried to the bottom of the canal. It is less irritating than gutta percha if any should pass through the apex. It is unsuitable in cases where a post is to be cemented in place, because it never becomes sufficiently solid to resist the pressure of cementation, and is driven through the apex.

Paraffin Root-filling Compound: Thymol, 2 parts; Bismuth trioxid, 30 parts; hard paraffin melting point 56-58 deg. C. (133-136 deg. F.), 68 parts.

The Technic of Filling Root Canals with Paraffin Compound. The *sine qua non* of a successful paraffin root-canal filling is an absolutely dry root canal.—*A. E. Webster, Northwestern Dental Journal.*

The Soft Tissues

Always respect and protect the soft tissues. Should you accidentally lacerate them, trim any ragged edges with surgical scissors, sterilize with iodin, and if necessary to keep the edges in position, pack lightly with five per cent. iodoform gauze.

It is important to curette every socket following the extraction of an infected tooth, for it is just as necessary to remove the pyogenic membrane as it is to extract the diseased apex.

Remove all crumbs and any broken sections of process. Use iodin freely and pack a socket lightly with gauze if you fear premature closing of the orifice.—*B. B. Palmer, Journal Allied Dental Societies.*

Use for Old Fissure Burs

There are many occasions for the use of a drill. Opening through enamel for cavity extension, gaining entrance on the lingual surface of an anterior tooth for pulp removal, cutting old amalgam and many other operations. Take an old fissure bur, grind it flat on two sides, leaving the two edges with the old cuttings on them. Then grind the point with its two bevels to suit your desire. The more the taper to this bevel the faster it will cut. This will make a better drill than you can buy.

—*F. W. Frahm, Pacific Dental Gazette.*

Preventive Treatment

Now that we realize more fully the importance of properly filled root canals and the difficulty encountered in filling them, we appreciate the value of a vital pulp even more than before. Every effort to preserve the vitality of the pulp should be made, and more frequent examinations of the teeth for caries should be made.—*Edgar D. Coolidge, Dental Review.*

Improving Condition of Teeth by Grinding

The sentiment which often restrains us from trimming up an elongated tooth in the opposite jaw, "because it is a perfectly good tooth," is a fallacy which frequently gives rise to very faulty articulation, and is for the same reason a misplaced emotion—as from a rational consideration of the entire mouth as a unit we must conclude that such a tooth may be a *sound* tooth, but it is not a *good* tooth until it is made to function normally.

—*F. H. Orton, Dominion Dental Journal.*

Repairing Defects at Margin of Inlays

For gingival margin where defects are most common, with small spatula melt onto the margin of the casting just about wax enough to fill the defect, place in cavity, forcing casting to place, pass a warm burnisher into the interproximal space, removing any surplus wax. Satisfy yourself that there is no surplus wax under the casting other than the defect, remove the casting and wax, cut a piece of platinum just a little larger than the wax, sufficient to lap over the enamel margin, about one millimeter; conform this platinum to the wax with slight pressure, insert casting, wax and platinum all at once, force casting to place while you burnish platinum to enamel margin, remove, invest and solder as above.—*C. C. Corbett, Dental Review.*

Discoloration of Facings

Frequently a beautiful piece of crown or bridge work, when long pin facings have been employed, becomes unsatisfactory because the facings have become discolored. This is usually due to organic deposits between the facing and its backing, because the latter is not well adapted to the former. To overcome this the backing should be swaged to the facing by means of one of the many swaging devices now on the market, rather than burnishing the metal, as was formerly done.—*Practical Hints, Australian Journal of Dentistry.*

Injecting for Conductive Anesthesia

To get results it is not necessary to inject into the nerve trunk but near it, into the connective tissue around the nerve. When this is done there is but slight danger of injuring the nerve. If injection is made into certain muscles it may be one of the causes of ill effects for a while.

—*J. H. Huschart, American Dentist.*

Same Story Everywhere

The mouths of 3,000 children examined at the Meisic school, Manila, show 98 out of every 100 with one or more teeth decayed. Dr. Lewis Ottofy is responsible for the maintenance of a school dental clinic which is supported by popular subscriptions and materials donated by American dental firms.

—*Oral Hygiene.*

The Firestone Rubber Tire Company, Akron, Ohio, have recently set aside $1,000,000 as a welfare fund for the employes. The company has established complete medical and dental departments which give free advice and aid to all employes.—*Oral Hygiene.*

"Focal Infection"

Certain organs or tissues in the body seem favorable for invasion and growth of some forms of bacteria. These are called "focal localities," and those of most interest to the dentist or oral surgeon are the teeth and the surrounding tissues, perhaps including the tonsils. We feel reasonably sure that from these focal localities, when diseased or infected, certain bacteria or toxins pass into the general system in some manner not as yet fully understood. "Focal infections," says Rosenow, "are not to be viewed merely as a place of entrance of bacteria, but rather as a place where conditions are favorable for them to acquire the properties which give them a wide range of affinity for the various structures."—*Fulton Risdon, Oral Health.*

A cardinal rule to follow is never to use an instrument on any patient which you would not willingly have used in your own mouth. Adhere to this rule rigidly, day after day, and cleanliness of instruments will become a fixed habit.—*C. N. Johnson, Dental Cosmos.*

A Layman's Views

As a matter of fact, wide-awake doctors everywhere are coming to look at patients' teeth in much the same way that old-time practitioners examined the tongue. For one of the most notable advances in the recent history of medical science is based on a growing conviction, backed by widespread experience, that the general state of health is largely controlled by the condition of the teeth and gums.—*Philadelphia North American, Oral Health.*

Arsenic

In my opinion arsenic is too dangerous a drug to be used in the destruction of a tooth pulp. We have no means of safeguarding the patient against the possibility of the action of the drug passing through the foramina and doing to the tissues surrounding the apex just what it did to the pulp.

—*Elmer S. Best, Journal Allied Dental Societies.*

Use of NA and K

Sodium and potassium is introduced into the canals only in case portions of the pulp remain which cannot be removed by means of the broaches. It should be kept in mind that sodium and potassium acts by virtue of its great affinity for water, and therefore destroys any organic material whether living or dead, and should not be employed in large canals from which a vital pulp has been removed.—*S. M. Hinman, New Jersey Dental Journal.*

Silver Nitrate as Hemostatic

In cases of irritating hemorrhage at the gum margins in filling cavities which are close to the margin, a light touch with silver nitrate crystals will make a comfortable field for working. It is also useful in stopping persistent capillary hemorrhage after extraction.—*Oral Health.*

Inserting Silicate Cements

It is by no means necessary to always use the rubber dam in inserting the silicates. What is necessary is absolute dryness for several minutes. Secure this in any way you choose and the results will be good.

—*Arthur G. Smith, Dental Review.*

A Handy Matrix for Large Filling Restorations

One of the most satisfactory matrixes for use in those cases in which it is necessary to embrace the whole tooth, especially where the cavity extends below the gingival margin to any extent, is the ordinary anchor clamp band used in orthodontia work. After removing the tube for carrying the bar, the band can be quickly and easily adjusted to the tooth and screwed up. This is a much more satisfactory method than using the usual hand-made matrix, and has the great advantage of the operator's being able to use the band again and again for this purpose.—*W. S. Wilkinson, Oral Health.*

The Willard Pyorrhea Treatment

After defrauding the public of amounts estimated by the federal investigators at $75,000 a year by means of a fake cure for pyorrhea, F. W. Willard, M.D., D.D.S., has been denied the use of the United States mails. The business of the Willard concern, apparently owned by Oren Oneal, consisted of a mail-order plan of a so-called home treatment for pyorrhea or Riggs' disease.—*Jour. A. M. A., per Ohio State Medical Journal.*

Root-Canal Fillings

Much has been written about the necessity for filling root canals exactly to the apex—so much so, in fact, that we have lost sight of the prime factor in this operation, namely, surgical asepsis. The aseptic mechanical reaming of canals is far more important than the medicinal treatment. It is well to bear in mind that a tooth with an aseptic root-canal filling that extends only half way into the canal, or all the way through the apex, is immeasurably less likely to cause trouble than one in which a perfect root-canal filling exists, but which is surgically unclean.

—*Geo. Rosenbaum, Dental Cosmos.*

The Root Canal a Syringe

This root canal may be likened to a hypodermic syringe and alternate pressure and yielding of mastication upon the tooth produces a pumping effect which forces small quantities of the contents into surrounding tissues and the circulation.—*W. S. Hewett, New Jersey Dental Journal.*

Gold Crowns in Contact with Amalgam, Especially Copper Amalgam Fillings

If a crown, when finished, will be in contact with an amalgam filling, or if it is apparent that sooner or later an amalgam filling will be put in or repaired in contact with the crown, one is usually anxious as to the staining or destruction of the crown. In these cases I solder platinum foil onto the contacting surface of the crown, and have the comfortable feeling that it is adequately and permanently protected. The platinum need not be observable.—*Hugh Patterson, Commonwealth Dental Review.*

The use of pure silver wire as a "probe" for exploring fistulous tracts may not be known to all of you. Fine wire of pure silver is used. The end is fused to a small "ball," thus softening the silver and making it flexible, at the same time completely sterilizing it.

To apply Ag. NO^3 to any spot within the mouth, e.g., ulcerations, sensitive dentin, etc., fuse a small piece of the caustic onto the end of a silver wire, using the remaining part of the wire as a handle. One can touch the exact spot desired, without the risk of cauterizing adjacent soft tissues, as one might do when using the "stick" form of lunar caustic.

—*F. G. Butler-Wood, Australian Journal of Dentistry.*

SOCIETY·ANNOUNCEMENTS

Michigan State Board

The next Regular Meeting of the Michigan State Board of Dental Examiners will be held in the City of Ann Arbor, in the Dental Building of the Dental Department of the University of Michigan, June 18th to 23rd, both inclusive. This meeting will be held for the purpose of offering an examination to all eligible candidates who wish to apply for a license to practice dentistry in the state of Michigan. All candidates must furnish the Secretary with application and fee not later than ten days prior to examination. Applications and all other information may be obtained by addressing the Secretary-Treasurer.

E. O. GILLESPIE, Stephenson, Mich.

Indiana State Board

The next meeting of the Indiana State Board of Dental Examiners will be held at the State House, Indianapolis, June 18th to 23d, inclusive. For application blanks and full particulars, address Dr. Fred J. Prow, Bloomington, Indiana.

Important Notice

At a joint meeting of the Ad Interim Committee of the National Dental Association and the Advisory Committee of the Preparedness League of American Dentists held in Buffalo, April 26, 1917, a resolution was passed establishing an Advisory Committee composed of the present officers, Advisory Board, Board of Trustees and the Ad Interim Committee of the National Dental Association. Action was taken confirming the permanent organization of the League as approved by the National Dental Association. It was also decided that the entrance fee to the League of $1.00 would continue in force.

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NATIONAL DENTAL ASSOCIATION ANNOUNCEMENTS

RAILROAD RATES TO THE TWENTY-FIRST ANNUAL SESSIONS OF THE NATIONAL DENTAL ASSOCIATION, NEW YORK CITY, OCTOBER 22-26, 1917

The Trunk Lines, New England and Central Passenger Associations, have granted a rate of two cents per mile in each direction, going and returning via the same route only, limited to midnight of October 30th.

Going tickets in Trunk Line territory will be on sale October 19th, 20th, 21st, at the one-way fares, on the certificate plan, these certificates to be endorsed by General Secretary Otto U. King and to be validated by the Special Agent of the railroads, who will be in attendance on October 24th, 25th, 26th. Return tickets to be sold on presentation of validated certificates October 24th to 29th at the difference between the fares paid on the going trip and the fares for the round trip. Return limited to continuous passage to destination and not later than October 30th. This applies on tickets with a minimum of $1.00 for round trip.

New England Passenger Association tickets to be sold or certificates issued and good going October 19th, 20th and 21st, and returning not later than October 30th, two cents per mile each direction, shore line mileage, going and returning via the same route only.

Central Passenger Association territory round trip tickets requiring validation at New York City will be sold on October 19th, 20th and 21st, with a final return on October 30th, two cents per mile in each direction.

There will be no fee for validation.

Committee on Transportation,
D. C. Bacon, *Chairman.*

Tennessee State Board

The Tennessee State Dental Board will hold its next meeting June 12-16 inclusive, at the Gayoso Hotel, Memphis, Tenn. Further information and application blanks can be obtained from the secretary, Dr. Walter G. Hutchison, Doctors Bldg., Nashville, Tenn.

New Mexico State Society

The annual meeting of the New Mexico State Dental Society will be held at Albuquerque, N. M., June 25, 26 and 27. Papers and clinics of unusual interest have been secured. All ethical dentists are invited to attend and take part.

C. A. Eller, *Pres.*, Albuquerque, N. M.
J. J. Clark, *Sec.-Treas.*

Tennessee State

Golden Jubilee Meeting, June 19-22, 1917

Following is a synopsis of the program:

Dr. Arthur E. Smith, Chicago, Ill., "Nerve Blocking Anesthesia." Two or three lectures illustrated with slides and moving pictures. Table clinic with wet specimens and a practical chair clinic. Assisted by Dr. J. J. Ogden, of Memphis, Tenn.

Dr. Burton Lee Thorpe, St. Louis, Mo., "Practical Importance and Absolute Necessity of Mouth Hygiene." Dr. Thorpe approaches this all-important subject in an original way and forever settles the question of obligation and service.

Dr. Charles H. Mayo, Rochester, Minn., "The Relation of Mouth Infection to Localized Systemic Disease." While Dr. Mayo has not been able to reply to our invitation, it is hoped he will accept, upon his return to Rochester.

Dr. Arthur D. Black, Chicago, Ill., "The Prevalence and Treatment of Peridental Disease."

Dr. Henry W. Morgan, Nashville, Tenn., "Fifty Years of History." No one is more thoroughly capable of presenting the interesting history of our organization, which was founded by his father, than Dr. Morgan.

"Treatment of Root Canals, Including Root-End Resection." This important subject will be presented by one of the best men making a specialty of this work.

Descriptive Clinics—Moving Pictures: "Wound Sterilization," by Dr. Alexis Carrel; "Plastic Surgery of the Face and Jaw," by Dr. Pont; "Original Method of Taking Impressions," by Dr. Edward H. Angle; "Application of Angle's New Ribbon Arch Appliance," by Dr. Edward H. Angle; "Apicoectomy," by Dr. A. Berger or Dr. Joseph M. Levy; "Repair of Fracture of Jaw," by Dr. A. Berger; "Periodontia Clinic," by Dr. Paul R. Stillman; "Root-Canal Filling," by Dr. R. Ottolengui; "Dental Prophylaxis" and "The Dental Hygienist," (seven reels in all) by Dr. Alfred C. Fones.

General Clinics: Fifty of the best clinics upon the most important subjects given by progressive and original men of the profession. A full list cannot be included in this synopsis.

Entertainments, Tuesday evening, June 19, boat ride, dancing and refreshments. Wednesday evening, June 20, public address and reception. Thursday evening, Jubilee banquet (all night).

Ladies will be entertained with luncheon, theatre party and reception, in addition to the boat ride and banquet.

J. D. Towner, R. S. Henry,
A. J. Cottrell, B. H. Johnson,
Program Committee.

Georgia State

The forty-eighth annual meeting of the Georgia State Dental Society will be held at Brunswick, Ga., June 14, 15 and 16, beginning Thursday, June 14th. We extend a most cordial invitation to members of other associations to meet with us. For application blanks and full particulars, address, M. M. Forbes, *Secy.*

803-04 Candler Bldg., Atlanta, Ga.

South Carolina State Board

The next annual meeting of the South Carolina State Board of Dental Examiners will be held at the Jefferson Hotel, Columbia, S. C., beginning promptly at 9 o'clock Tuesday morning, June 26th, 1917. All applications must be in the hands of the secretary by June 16th.

Application blanks and full information may be obtained by addressing,

R. L. Spencer, *Secy.* Bennettsville, S. C.

Pennsylvania State Board

The next examination of the Pennsylvania Board of Dental Examiners will be held in Music Fund Hall, 808 Locust street, Philadelphia, and the College of Pharmacy Building, Pittsburgh, on Wednesday, Thursday, Friday and Saturday, June 13th, 14th, 15th and 16th, 1917. The examination in operative dentistry will be held on Wednesday, June 13th, at 8:30 o'clock, in the Evans Dental Institute, 40th and Spruce street, Philadelphia, and the University of Pittsburgh Dental Building, Pittsburgh. The examination in prosthetic dentistry will be held on Wednesday at 1:30. Application papers can be secured from the Department of Public Instruction, Harrisburg, For further information address the secretary, Alexander H. Reynolds, 4630 Chester Ave., Philadelphia.

Arkansas State Board

The Arkansas State Board of Dental Examiners will hold its annual meeting and examination at the Marion Hotel in Little Rock, Arkansas, on Thursday, Friday and Saturday, June 21st, 22d and 23d.

Applicant for examination must be a graduate of a reputable dental school. Examination, theoretical and practical. Fee and application should be filed as soon as convenient and at latest ten days before the examination. For further information, address,

Dr. I. M. Sternberg, *Secy.*,
Ft. Smith, Ark.

Connecticut State

The fifty-third annual meeting of the Connecticut State Dental Association will be held at the Hotel Griswold, New London, Conn., June 14th, 15th and 16th, 1917. Geo. S. B. Leonard, *Secy.*

Wisconsin State Board

The Wisconsin State Board of Dental Examiners will meet to give examinations at Berlin Arcade Hall (fourth floor), corner 3rd and North, Milwaukee, Wis., beginning June 20th at 9:00 o'clock A. M. Application with fees and necessary preliminary credentials must be sent in to the secretary twenty days before examination. F. A. TATE, D.D.S., *Secy.*

Vermont State Board

The next meeting of the Vermont Board of Dental Examiners for the examination of candidates to practice in Vermont, will be held at the State House, Montpelier, commencing at 2:00 P.M., on June 25th, 1917, and continuing for three days.

To be eligible for examination a candidate must be twenty-one years of age, a graduate of a high school of the first class and a graduate of a reputable dental college. Applications must be in the hands of the secretary not later than June 15th. For further information apply to Harry F. Hamilton, Newport, Vermont.

National Association of Dental Faculties

The 1917 meeting of the N. A. D. F. will be held at the Astor Hotel, New York City, Friday and Saturday, October 19 and 20, 1917.

Executive committee will meet at nine o'clock A. M., and the general session will open at ten o'clock as usual.

CHAS. CHANNING ALLEN. D.D.S.. *Secy.*
N.W. corner 10th and Troost, Kansas City, Mo

Rhode Island Board of Registration in Dentistry

The Rhode Island Board of Dental Examiners will hold its next examinations on July 5, 6, 7, 1917, in the State House in Providence. For further information, address, ERNEST A. CHARBONNEL, *Secy.*
139 Mathewson street, Providence, R. I.

North Carolina State Board

The next meeting of the North Carolina State Board of Dental Examiners will be held at Durham, N. C., beginning promptly at 9:00 o'clock on Monday morning, June 25, 1917. For further information and application blanks address the secretary, F. L. Hunt, Secy., Asheville, N. C.

THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS

Vol. XXXVII July, 1917 No. 7

We Publish the Proceedings of the Following Societies:

The Ohio State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
Iowa State Dental Society
Texas State Dental Society
Tennessee State Dental Society
Section on Stomatology—American Medical Association
Interstate Association of Anesthetists
and Several Local Dental Societies

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L. P. Bethel, M.D., D.D.S., Editor-in-Chief

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REGULAR CONTRIBUTIONS

THE ORAL CAVITY AS A FOCUS OF INFECTION*

BY CLYDE H. HEBBLE, D.D.S., COLUMBUS, OHIO

SUPERINTENDENT OF OPERATIVE CLINIC, INSTRUCTOR IN OPERATIVE TECHNIC AND INSTRUCTOR IN CLINICAL OPERATIVE DENTISTRY, COLLEGE OF DENTISTRY, OHIO STATE UNIVERSITY

IT IS NEEDLESS for me to say that I fully appreciate the honor of this opportunity to discuss a subject in which both the medical and dental professions have displayed an emphatic and intense interest, and about which there is an unfortunate and very decided lack of unanimity of opinion. During the past few years this matter has been persistently presented to the dental profession by the medical profession and certain dental writers; the result has been that many dentists have impatiently resented the suggestion as an unwarranted imputation, intended to cover the incapacity of the medical profession to cope with certain systemic disorders. Both dentists and physicians were inclined at first to be more or less indignant, then skeptical, while more recently many have become indifferent. However, the more thoughtful men in both professions have taken the sensible position that there may be truth in the idea and are revising their methods of practice in accord with all that becomes definitely known, or that seems reasonably possible to inhibit focal infection from dental disorders. It is unfortunate that we cannot get a better correlation of thought and action by the entire medical and dental professions on so important a matter. Thoughtless or unconvinced dentists are proceeding with careless root-canal treatments, because of failure in their estimation to establish a definite connection between local and systemic diseases, while many radically-inclined medical men are insisting that every suspicious

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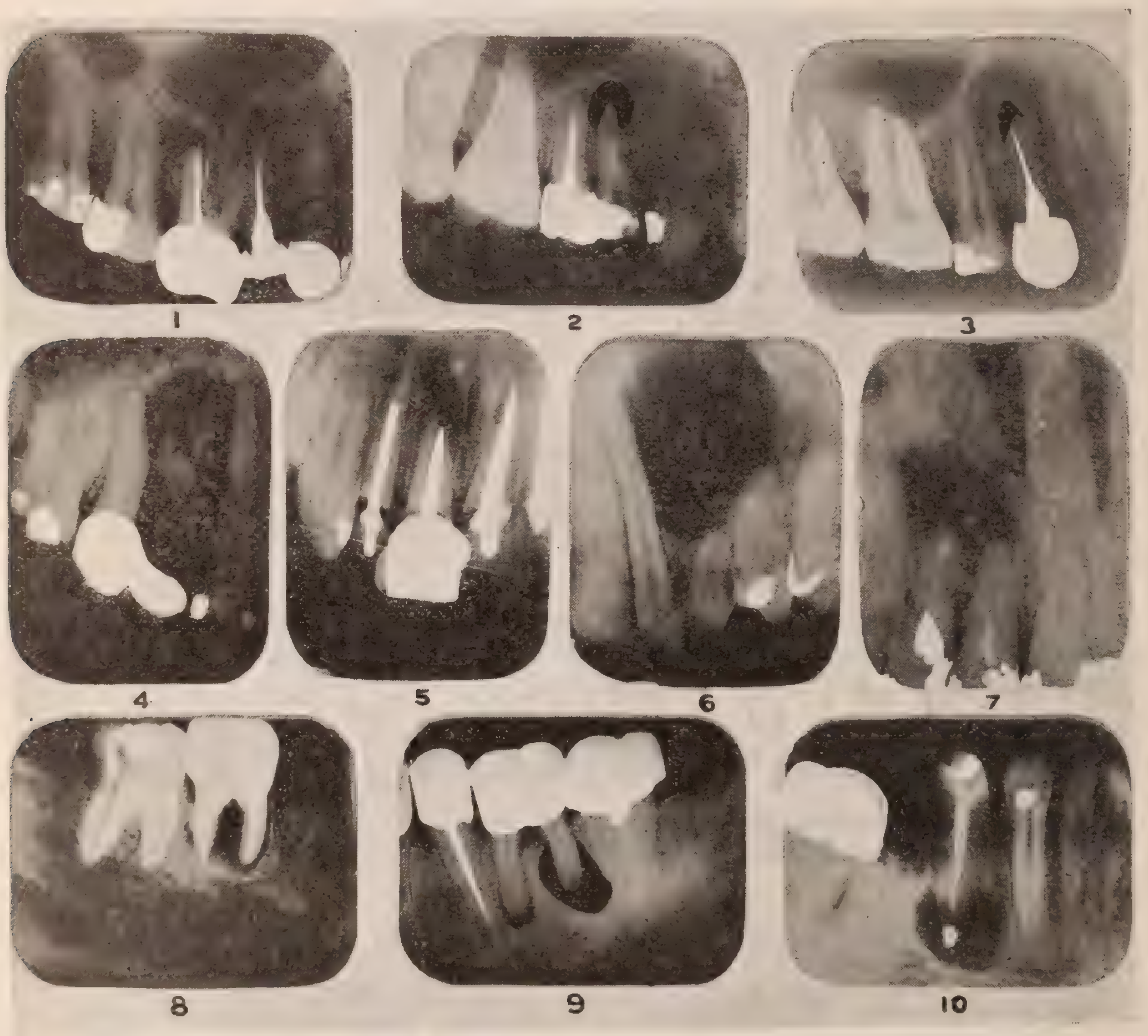
*Read before a Joint Meeting of the Columbus Academy of Medicine and Columbus Dental Society, 1917.



Figs. 1, 2 and 3—Typical apical abscesses.
Fig. 4—Large cavity in process containing two fragments of roots.
Fig. 5—Apical abscess with absorption of apex.
Fig. 6—Enormous abscess cavity in process.
Fig. 7—Large abscess cavity with roots of two teeth projecting into it.
Fig. 8—Complete absorption of bone around roots of molar.
Fig. 9—Apical abscess involving both roots of molar.
Fig. 10—Large abscess cavity containing piece of root-canal filling.

tooth shall be removed from the mouths of patients who do not respond promptly to usual medical treatment. There is no doubt but that much injury has and will result from these antagonistic attitudes, while the problem is being evolved from a conglomerate mass of ideas to a clearly-defined result. At first thought, it seems unfortunate that many of our best scientific workers and research men have adopted strongly negative attitudes on this important subject; this is a condition of affairs to be expected, however, and will in the end tend to develop a more comprehensive research, which in turn may some day establish the truth. It is a complicated problem which will take time, patient work and wisdom to solve. Every new proposal in dentistry, and I presume in medicine or any other field of human activity, passes through certain phases of reaction on the part of the profession concerned, usually characterized by incredulity, popularity, abuse, and finally, if found to be of practical value, is adopted and takes its place along with other recognized procedures.

From a purely dental viewpoint, we are principally concerned with three well-defined and all-too-prevalent conditions found within the oral cavity, any one or all of which may be held responsible in many cases for systemic infections of various manifestations. I refer to the apical or alveolar abscess, pyorrhea alveolaris and general neglect, resulting in accumulations of sordes and calcareous deposits upon the various surfaces of the teeth. The apical abscess seems to be regarded as constituting the most frequent focus of systemic infection. This is especially true of that variety known as the "blind abscess." It would appear that the great prevalence of this especial form of apical abscess was, until recent years, as little suspected by many dentists as by physicians, in spite of the fact that they were almost daily engaged in the treatment of some manifestation resulting from this form of abscess. Now that the facts are becoming known, in large part by reason of the perfecting of Roentgen-ray technic, many readjustments of practice, both medical and dental, are being found necessary. In a measure at least it is the difficulties of these readjustments rather than a lack of proof of the systemic effect of oral conditions which have led to certain misunderstandings, for the correction of which the only essential is a series of frank discussions, followed by team work between the physician and dentist. The almost startling frequency of alveolar abscess, as well as other forms of dental infection, has so impressed many physicians and not a few dentists, that they are ready to ascribe a majority of human ailments to dental lesions, and attempt to correct them all by the extraction of teeth, without proof of an incurable condition of the teeth, or definite evidence of the relation of the dental infection to the systemic disease. This extreme and wholly unwarranted position has, in many quarters, brought about a reaction, resulting in a reversion of opinion to the other extreme, at which are found a group who are ready to declare that diseases of the oral cavity have no connection whatever with infections in other parts of the body. They have arrived at this conclusion, regardless of the presence or absence of oral suppurations, and regard it as a matter of no concern to either the dentist or physician. Looking at the problem from an impersonal viewpoint, it is not difficult to see that neither of these positions can be wholly right or entirely wrong, but that the truth must lie somewhere between. Another group of enthusiasts in both professions have assumed that in a patient who is suffering, we will say from arthritis, in whose mouth is also found one or more apical abscesses, there is always a direct ethiologic relation between the two, and that removal of the apical abscess will surely result in the cure of the arthritis. It may occasionally happen that we meet with such a sequence of events, but more often we find that the alveolus is but one of several foci of chronic infection in the body and is really secondary to some previously existing infection.

According to Irons (*Journal A. M. A.*, Sept. 16, 1916) an unselected group of 329 patients in a ward in Cook County Hospital, Chicago, was studied and the relations of all discoverable infectious processes tabulated for each patient. The patients were then classified, according to final diagnosis, and the percentage of each type of infection in each group calculated. Roentgen-ray studies, most of which were confirmed by consultation with dental surgeons, were obtained of 124 of the 329 patients. Care was taken to see that the patients submitted to Roentgen-ray examination were fairly representative of the entire group. The results were most interesting. In 44% of the 124 patients alveolar abscesses were found. In the arthritic group, 76% had alveolar abscesses. In the group of nephritis and cardio-vascular disease, 47%; other diseases, including pneumonias, 23%, or less than one-third of the percentage in the arthritic group. Abnormalities in tonsils, as expressed by hypertrophy, were present in 45% of the arthritic groups, in 24% of the cardio-vascular group and in 19% of the remainder. Other chronic infections, such as those of sinuses or genito-urinary tract, were found in 21% of the arthritic group, 13% in the cardio-vascular group and 11% of the other diseases. Syphilis, either from the history, clinical evidence or Wasserman, was found in 23% of the arthritic group, 39% of the cardio-vascular group and 13% of other diseases. The result of these observations tends to show that not all arthritic and other certain types of systemic disease is due to apical abscess or to tonsilar infection, but the preponderance of such lesions in this group suggests that these infections may have an important bearing in the production of chronic arthritis, certain types of cardio-vascular disease and certain forms of nephritis, in which cold and exposure are only part of the determining factors. Bearing this in mind, it would seem that in estimating the results obtained from the correction of alveolar abscess or other mouth lesions, proper consideration should be given the possible presence and influence of other infectious foci and neither too great credit for success or too great censure for failure imposed upon the dentist, who deals with only one of the possible factors involved in the recovery of the patient.

In experiments conducted at the University of Minnesota Hospital by

Ulrich (*Journal A. M. A.*, November, 1915) a little over 61% of all artificially devitalized teeth were found with apical abscesses, and the total number of abscesses on 1350 teeth, including those found on non-vital teeth due to caries or trauma, was 83%. One hundred and fifty-nine of these cases had bacteriologic review. Henrici reported 107 cases from the university clinic, of which 100 gave the streptococcus viridans; 52 were from the private clinic of Ulrich, 50 of which gave streptococcus viridans or streptococcus hemolyticus. Occasionally streptococcus mocosa was recovered. Thus, of 500 cases examined, 150 gave evidence of streptococcus, either in pure culture or as the dominant organism. Occasionally the staphylcoccus aureus or albus, or the micrococcus catarrhalis was also observed in conjunction with streptococcus. Gilmer and Moody (*Journal A. M. A.*, Dec. 5, 1914) report streptococci, both streptococcus viridans and streptococcus hemolyticus, as well as other organisms, such as staphylcoccus aureus, micrococcus catarrhalis, the bacillus fusiformis, and in two instances, diphtheroid bacilli. Hartzell and Henrici (*Journal A. M. A.*, March, 1915) found in 162 cases that 150 yield streptococci. They report inoculation of 24 rabbits with streptococcus viridans, isolated from apical abscesses, with the following results: Heart lesions were found in five, kidney lesions in seven, those of the aorta in three and of the joints, two. Ulrich further remarks: "At the time of devitalization of a tooth, apical trauma occurs, with its subsequent area of lowered resistance and possibly lowered or changed oxygen pressure, thereby forming an ideal nidus for streptoccal growth. This is possibly the explanation for all apical abscesses, with the possible exception of those capping pulpless roots, following caries. Under pre-existing conditions of caries, I can readily see that infection may travel along the canal, producing direct infection of the alveolar bone; the suggestion first made by me that these foci are not primarily dental but secondary deposits, that is, hematogenous in origin, has produced stormy discussions among dentists. One group has accepted the suggestion, while the other claims that these abscesses are due to dental technic, that is, a matter of poor root-canal filling. It seems highly improbable to me that out of 159 possible infections, 150 should turn out streptoccal in origin, if there were not some broad biologic law, such as the selective and mutative activity of this group, to account for such results."

It is the opinion of the writer that these abscesses are due in large part, in the case, we will say, of artificially or chemically devitalized teeth, to the infection being carried into the root canal or pulp chamber of the tooth at some stage of the treatment of the pulp. Unless great care is exercised, it is ridiculously easy to carry infection to the apex of a root canal with the nerve broach, which is used to remove the pulp from the tooth. Then again, careless operators are frequently guilty of allowing saliva to flow into the pulp chamber or root canal of the tooth being operated upon. In the majority of mouths it is a matter of conjecture only as to how many teeth could be infected by but one drop of saliva, but it is safe to say that we would find the number alarmingly high; this would depend somewhat of course upon conditions in any one particular mouth and the general state of health of the individual. We frequently find sound teeth, especially in the anterior part of the mouth, which are carrying non-vital pulps, due to the accidental application of trauma. If these teeth are not carious and are not split, in other words, if no opening is made at any point in the tooth's surface and its continuity remains undisturbed, the shock of trauma may devitalize the pulp, to be followed by all the symptoms of inflammation, which in a few days automatically subsides. The patient usually decides that the tooth has not been permanently injured and will not need further attention; a few months later a decided discoloration becomes noticeable and upon opening into such a tooth, we find no odor or other indications of infection; it is simply a mass of non-infected organic material. However, if this same tooth should have been carious before the accident or should have become so afterwards, or if there should have been any considerable break in the continuity of the enamel surface from any cause, thus allowing the ingress of the pus-producing bacteria (always found in tooth cavities) we should have had, first, a putrescent or infected pulp chamber and canal and, as soon as the bacterial invasion had passed through the apical foramen of the root, an abscess. This process would undoubtedly be considerably hastened by lowered resistance in the periapical tissue, brought about by the traumatic shock. I mention this one phase of faulty operative procedure on the part of the dentist, merely because of its all too common prevalence, but with no intention to convey the meaning that it is the sole cause of apical abscesses. There are other numerous causative factors, such as failure to remove all of the pulpal tissue, improperly-filled canals, the injudicious use of destroying or irritating drugs, failure to adequately seal the root canal and pulp chamber in the introduction of permanent filling materials, and by far the most common, aside from faulty instrumentation, neglect of decayed teeth by the patients themselves. A recognition on the part of the public that preventive dentistry is infinitely more satisfactory than painful and more or less uncertain reparative dentistry, will result, to a very great extent, in the elimination of the alveolar abscess. A vital tooth which can be restored to its normal function without molesting the pulp in any way, will not be likely to ever constitute an etiologic factor in the production of systemic infection.

Pyorrhea, or purulent alveolitis, is now almost universally recognized by both the physician and dentist as constituting one of the most potent and prolific sources of systemic infection. It is a chronic, non-specific disease of the alveolar process and all the immediately adjacent structures, producing a dissolution of the osseous elements of the alveolus, and may or may not be accompanied by cavity formation in the cervix of the teeth involved. I shall not here attempt the descriptive pathology of the disease or its various characteristics, neither have I the courage to venture an opinion as to its etiology, but of its far-reaching effects through general systemic infection there can be but little doubt. However, in connection with the etiology of this disease, I recall an interesting case which came under my personal observation a few years ago. I submit this, not with an attempt to present any particular argument, other than to illustrate the fact that in some cases at least the constitutional condition of the patient is a most important causative factor to take into consideration in the treatment of this disorder; indeed, it might be said that I am digressing somewhat as this case represents in a measure the very antithesis of my subject.

The patient, a man aged 43, apparently healthy, in whose mouth had developed an unusually virulent case of purulent alveolitis. The teeth were all more or less loosened, two or three so much so as to necessitate their extraction; in fact, practically all the soft and osseous attachments around these teeth had been destroyed. A pus pocket encircled each tooth, the calcareous and seruminal deposits were slight, the breath fetid. Each tooth was carefully scaled and polished and local treatments used on the soft tissues which, in the course of two or three months, resulted in what seemed to be a complete cure. Inquiry had been made at the beginning of the treatment as to the constitutional condition of the patient and the fact determined that for several months he had been treated for the alleviation of a gastric disturbance. The patient was not seen again, after being discharged as cured, for a matter of seven or eight months, when he again presented himself for examination. Mouth found to be in excellent condition, gingival ulcers had disappeared, teeth tightened, gums normal color, breath good. I was then informed that within a few weeks following last local treatment and discharge of patient, condition in mouth resumed as before first treatment; at this point another physician was consulted, who determined a condition of hyperacidity of the alimentary tract. Patient was dieted and administered a simple combination of basic or alkaline powders. There was no local treatment by dentist in the meantime, yet pyorrhea disappeared, as already described. The teeth, at the time of the second examination, had acquired considerable calcareous deposits, more so in fact that when the disturbance first manifested itself, but in spite of this fact, excepting a slight gingivitis, it had produced no evil results. This, after all, serves as a splendid illustration of the interdependence of all the organs of the body, and proves to us the importance of not passing lightly over apparently trivial manifestations in diagnosis.

It has been definitely determined that the pus pockets produced by pyorrhea, as well as those resulting from ill-fitting crowns and bridge work, overhanging cervical margins of fillings and inlays, arsenic burns, calcareous deposits, etc., all contain in varying degree the various pus-producing cocci, the bacillus of typhoid fever, bacillus of diphtheria, bacillus of tuberculosis, bacillus of influenza, various families of spirochæte, the endamœba buccallis and the thrush fungus. To these might be added the virus of diseases of unknown or uncertain origin, such as the virus from measles, scarlet fever, mumps, infantile paralysis and small pox. In fact, the flora of the human mouth is so varied that it contains at one time or another almost all the pathogenic bacteria that have ever been recognized. Nearly one-half of all the bacteria in the oral cavity belong to the streptococcus group and the very surfaces of the teeth in neglected mouths constitute the habitat from which most of the streptococci procreate and spread to the balance of the body. By actual weight and count, Kligler (*Journal of the Allied Societies*, September, 1915) has shown that human tooth scrapings from healthy mouths contain from 6,000,000 to 8,000,000 bacteria to the milligram, and in diseased mouths from 600,000,000 to 800,000,000 bacteria to the milligram. By weight and count he has shown that 44% of this enormous mass of bacteria is streptococci, and from 18% to 22% is staphylococci.

Aside from the sources of infection already mentioned, it is a recognized fack that broken or decayed teeth, with open pulp chambers, form an avenue through which many of these bacteria enter the circulation. The gingival margin of the gums in the average individual is 30 linear inches in length. Into this crevice may drift the bacteria growing on 20 to 30 square inches of tooth surface, and if the growth is undisturbed the toxins and ferments produced soon injure the epithelial lining of the gingivus. This, together with the apical abscess, constitute two avenues through which great numbers of bacteria are conveyed into the circulation, so scattering them into the blood stream that immunity is broken down and local ulcers at the gum margins become the origin of secondary lesions, heart, joint, brain, liver, lymph nodes and intestinal mucous membrane. (Hartzell, Modern Hospital, Nov., 1916.)

Hartzell has also produced evidence, supported by clinical experience and experimental lesions produced in animals infected with human salivary streptococci, that 75% of all heart disease, both myocardial and endocardial is dependent upon streptococcus viridans and that many of the lesions of ordinary arthritis are due to the same cause; also that a great percentage of kidney disease is due to the same common mouth infection. These conclusions are the result of three years' experience, gained in the maintenance of a clinic for experimental purposes in the University of Minnesota Medical School Hospital, for the Research Institute of the National Dental Association. The work done here has been most thorough and no efforts have been spared to procure definitely established results. A great many arthritic cases, which had failed to respond to any form of therapeutic treatment, have improved in a most conclusive and gratifying way as a result of judicious dental treatment. MacMillan, at Cincinnati, is also engaged in work of a similar nature, and in a great many cases he has been able to show conclusively that the mouth constitutes the primary focus of infection in a variety of constitutional ailments.

The recognition of the important relation of oral conditions to systemic disease is a great step forward, and it is to be hoped that the period of extreme neglect of the past will never return. The readjustments in methods of diagnosis and the establishment of a rational conservatism will come gradually as we learn to appreciate the interdependence of all organs of the body, and the allied interests of the medical and dental professions. This advance, in turn, calls for better medical education, better dental education. The difficulties and misunderstandings occasioned by this one instance of overlapping interests, merely accentuates the necessity of broad-minded professional men, who can appreciate the problems of departments of human medicine other than their own.

DISCUSSION

Dr. S. D. Boak: In opening the discussion on Dr. Hebble's excellent paper, I first wish to commend him for the sane and conservative course he has advocated. The subject is an appaling one by reason of its vastness. It has been discussed and written upon so thoroughly in the past few years that little can be presented that has not been touched upon.

The medical and dental professions seem to be divided into factions; those that believe in the localized foci of infection in the mouth as the cause of general systemic conditions, and those who do not believe it has been proved. The ones who believe it has *not* been proved, concede the point that the mixed infections or micro-organisms can become active and virulent under certain conditions in the mouth and suitable systemic alteration. They agree that septic conditions of the mouth should be eliminated, the same as any gastro intestinal irritant, and care given it the same way that intestinal stasis should be taken care of. They claim the mouth is amply provided with defense through the leucocytic process of intracellular digestion, as in this way any organism that affects a blood entrance is disposed of; or otherwise the infiltration of bacteria is so slow that an immunity is created. They apparently rely wholly upon these two factors of resistance before the invading host can proliferate. In other words, the foci of infection around the teeth are so small that they cannot be responsible for the large and varied assortment of diseases that the enthusiasts on this subject claim them to be, and the manifestations of focal infestation in the mouth are really secondary to foci located in other parts of the body, and point to the fact with some justification that teeth become abscessed which have no signs of caries or gum lesions. This assertion should prove the enthusiasts' contention. If the blood stream can carry the infection to the apex of a tooth and cause an infection, why cannot the reverse be true?

We all have seen patients suffering from arthritis or rheumatism who have lost their teeth; there could be no foci of infection there, but that does not prove that there may not be a foci in the gall-bladder, liver or intestinal tract. We know that rheumatic attacks often occur after a patient has had an attack of grippe, typhoid or scarlet fever, in which there is no foci in either mouth or tonsils, but because the cause is obscure in these cases, it does not prove that rheumatism cannot be the result of a focal infection. I had a case referred to me the other day by the ward surgeon. The patient had a partial ankylosis of the mandibular joint. History: Patient suffering from anchylostomias and receiving large doses of thymol daily, etc.—but this case does not disprove the theory of focal infection being able to cause systemic disease. It is impossible for any of us to arrive at any definite conclusion in regard to this matter from a scientific standpoint, as all experiments have been made in animal tissues, and while it has been proven that the streptococci viridans can cause conditions similar to those in the human being, we assume that they are as virulent in the human tissue.

Dr. King, in the *Journal A. M. A.*, of January 13th, comes forward with the Connellan & King diplococcus as a source of infection. He says: "We believe that the absorption of chemical toxins from this micro-organism is capable of producing serious pathological lesions. It is found around the roots of teeth, but principally in the tonsillar crypts or fossæ after the tonsils have been removed." Dr. King goes on to mention five cases due to this diplococcus. He claims that it is not a pyogenic organism, but a powerful toxin producer. So in addition to the streptococci viridans and endamœba buccalis, we have this diplococcus added. I believe that we will find that the streptococcus hemolytic also will play a part as a determining factor in some of the systemic diseases.

Leaving the theoretical side of the controversy and going to the practical, those of us who have had occasion to treat cases with infected foci of the mouth must admit that a great many of them have been cured of systemic and local conditions far removed from the mouth, when the foci has been eliminated.

As an army dental surgeon of nearly sixteen years' service, I would lay special emphasis on the class of patients who present themselves and show a general neglect of the oral cavity. If this audience could examine the mouths of the recruits we receive, ninety-five per cent. of whom have never seen a dentist, and see the filthy condition of their mouths, you would believe almost any of the diseases claimed to be due to focal infection might emanate from that source. We realize that nature never intended us to have aseptic mouths, but *did* intend that we keep them free from filth. If I should propose in all seriousness to any member of the medical fraternity present to administer a 5 cc. dose hypodermically of the mixed infection *normally* present in this class of persons, he would think (and be justified in so doing) that I was a fit subject for the lunacy commission to act upon. Yet, gentlemen, there are thousands of people in this country of this class, who know nothing of oral asepsis, who are ingestating from one to ten cc. of this mixed infection every day. The intestinal tract must eliminate or absorb it, and you will grant that the acquired immunity of the person will care for this condition only so long as the opsonins are in excess or exactly adequate, and if they are in default of any special bacterium of the infection, the resistance is overcome, and may not inflammation or suppuration in any part of the body occur as a sequence? Take the cases of pyorrhea alveolaris you are all familiar with, do you not think that the constant ingestation of this pus will cause functional disturbances?

Dr. Hebble says, "Thoughtless or unconvinced dentists are proceeding with careless root-canal treatment." I should charge careless root-canal treatments and fillings to the first class rather than the second. A man may be unconvinced of a thing, yet will do his best for his patients according to the technic of our best accepted authorities. I am sure Dr. Hebble did not mean to impute that because a man was unconvinced of a theory, he would be careless of recognized operative procedure and his duty to his patient. Do you not think the failure of proper root-canal filling, even on the part of the best of our operators, is because it is a physical impossibility to fill a majority of canals successfully? *Why* this physical impossibility? Multiple openings in the apex. This thought was first started in my mind by reading an article in the July number of *Cosmos*, by Dr. Carl Grove, on "Multi-canaliculated Roots." I think you will find this the cause of the great majority of failures with the careful operator.

Most medical men are too busy with other more interesting subjects to think seriously on the subject of oral sepsis. If, however, a patient presented himself with as many small bone abscesses in the large bones of the body as he has abscesses in his mouth, you would give that patient every medical and surgical care possible. You would even make an autogenous vaccine if these abscesses persisted. Do you not think several blind abscesses of the bones of the face just as important to the patient? Even though you do not believe the theory that localized foci of infection in the mouth and tonsils can be the cause of general systemic conditions, do you not think your duty to your patient demands its eradication? If your patient has symptoms of gastric disturbance or intestinal disorders with no apparent cause from diet, do you not think it a proper procedure to examine the mouth and note the condition of it? In cases of pernicious anemia, is it not possible that the condition of the mouth with its products of decomposition may cause an alteration of digestive ferments and an improperly-prepared bolus for gastric digestion, with subsequent faulty metabolism and lack of sufficient nourishment?

In regard to the medical practitioner insisting upon the extraction of teeth, as suspected causes of systemic trouble, it would be much better to first assure ourselves that the offending tooth or teeth are surrounded by infected foci. In the case of the ten anterior teeth of the superior and inferior maxilla, an apicœctomy and thorough curetting of the foci should be the proper mode of procedure, rather than the removing of the offending teeth. The molar teeth present a different problem as far as an apicœctomy is concerned, and each operator must be the best judge as to its chances of success.

In conclusion, I wish to indorse Dr. Hebble's plea for a closer relationship between the dental and medical fraternities. We are both striving for the preservation of the health of mankind. Education is impressing upon parents the necessity for bringing their children to us as soon as the deciduous teeth erupt, thus taking charge of the health of the individual early in life and guarding against the improper development of the food and air tracts which are so essential to the proper physical development of the race. Dentistry is a specialty of medicine. The stomatologist, with a broad knowledge of general medicine and a particular training in his own field, is exactly on a par with the oculist, the laryngologist, or the obstetrician. Thorough knowledge of the principles of medicine must underlie all successful treatment of disease, and the patient must be regarded as an individual, not as a collection of separate organs, each to be treated alone, since one region of the body cannot be isolated from the entire organism or separated in its development, nutrition, function or disease, neither can its treatment be a separate matter. The person attempting to treat one part of the system must understand the whole, at least broadly, in order to apply general pathology and therapeutics to his particular field.

STERILIZATION*

BY J. R. CALLAHAN, D.D.S., CINCINNATI, OHIO

DR. S. MARX WHITE, of the University of Minnesota, *Journal of National Dental Association*, for October, page 281, says: "For the most part, dental asepsis has not yet reached the perfection of the surgical operating room. It becomes apparent that the methods used are such as to invite rather than prevent infection. These are questions, however, for the dentist."

However much we may dislike the sting, the truthfulness of the charge cannot be denied, whether justified or not. We take some comfort in the reply that the practices of the dental profession, as a whole, are as aseptic as that of the medical practitioner, and it may be further said, the work of few, if any, of even the best surgeons would be safe but for the vigilance of the faithful nurse. The pot calling the kettle black does not produce or preserve asepsis, nor should we throw dust in our own eyes by accusing others.

The first step toward asepsis, or at least a most important step toward asepsis, is the sterilizing of the hands. The hands generally are not aseptic; it requires a very thorough and systematic procedure to make them clean. After the ordinary washing it usually is possible to obtain a culture of germs from the finger nails, or interdigital folds. In rendering the hands surgically clean these places, therefore, are given particular attention. Notwithstanding this bacteriological experience shows that sometimes growths may be obtained from as much as five per cent. of these cases, when the hands are tested. The reasons are, on the one hand, that bacteria may penetrate the deeper layers of the epidermis where they become quite inaccessible to the cleansing measures, and is enhanced when frequent use of antiseptics has made the skin fissured and rough. Handling of plaster of Paris models produces what is called a rough skin. On the other hand, the secretions of the skin itself are not always sterile. The wearing of thin India rubber gloves by the dentist has not been deemed essential. Whether or not such a custom on the part of the dentist be essential or practical, the writer finds on many occasions the rubber glove to impart a considerable comfort in a sense of protection to both patient and operator. They do not interfere with the manipulation of small instruments to the extent that might be expected.

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*Read before the Ohio State Dental Society, December 1916.

The finger nails being properly trimmed, the hands and exposed parts of arms are scrubbed with soft soap in warm, running water. Brushes which have been sterilized by boiling are best suited for the purpose. The object of the warm soap suds is to soften the superficial germ-laden layers of the epidermis, and facilitate their mechanical removal. The bacterial debris, as it is set free, is rinsed away. If each step in this simple procedure be thoroughly and well done, the hands will be ready for the sterile gloves. If the gloves are not to be used, the bare hands may be made quite safe for dental operations by following the above technic to the point of drying the hands, then smear them over with a light coat of soft or liquid soap. Allow the soap film to dry on the hands. This smear of soap acts in a way like a glove, inasmuch as it fills in and over the superficial epidermis, keeping the fingers reasonably sterile unless they be brought in contact with moisture. If the fingers are of necessity kept in contact with moist surfaces, a finger stall or small napkin will at least partially relieve a very unpleasant situation —unpleasant to both patient and operator.

Particular care should be exercised by the dentist at all times to avoid direct contact of the bare hands with pus and bacterial discharges. Laxity in observing this precaution may lead to more disastrous results.

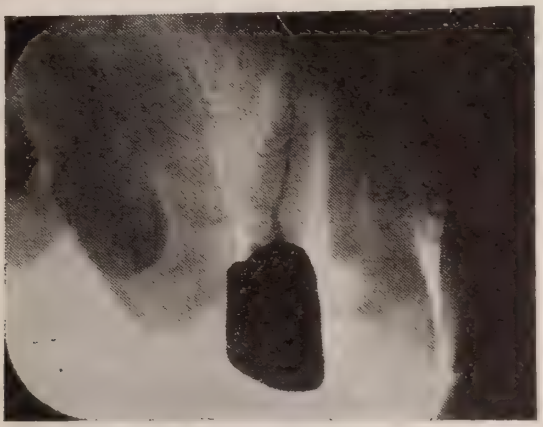
Many of the appliances displayed for sale by the dental supply dealers and sold in large quantities to the dentists throughout the land, discloses the fact that there is, on the part of a great many of our profession, a lack of understanding of the fundamentals of sterilization. Conspicuous glass cases on which in large gilt letters is displayed the misnomer, "Sterilizer;" much nearer the truth would be the label, "Dust Trap." In this form of sterilizers, dependence is placed on some form of formaldehyde, usually a small percentage of formaldehyde in tablet form. Said tablets soon lose the formaldehyde, becoming at once a worthless waste material. Formaldehyde is efficacious only in the presence of moisture. The humidity should not be lower than 60 per cent., and the temperature not less than 16 degrees C., in order to obtain the best results.

The evaporization of a sterilizing agent within a cabinet, however tight the case may be, without constant close attention to detail, soon becomes worthless. The more faith the operator places in the cabinet sterilizers the more dangerous they become.

The vegetative forms of bacteria are killed at 55 to 58 degrees C., by ten minutes' exposure in the presence of moisture. Dry heat is much less effective as a germicide than steam. In a dry atmosphere temperatures ranging from 140 to 180 degrees C. must be employed to insure sterilization. If steam under pressure be used, as in the autoclave, exposure of fifteen minutes to a temperature of 125 degrees C. is sufficient to destroy all known microbes. The difference between the moist and dry heat doubtless depends upon the fact that the chemical or physical changes that cause the coagulation of protein or death of protoplasm, take place like such actions generally, more readily in the presence of water.

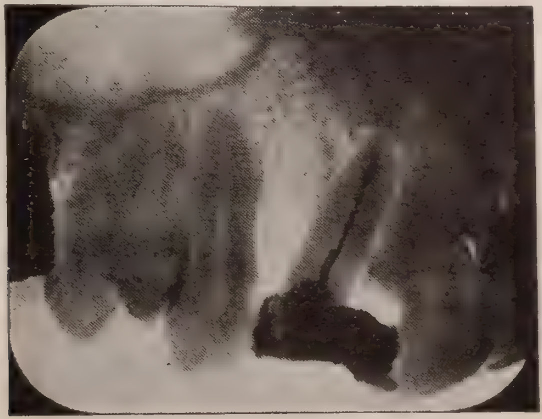
The majority of dental instruments may be sterilized by boiling fifteen minutes with water containing one per cent. of sodium carbonate. Almost any container can be used, but those appliances that absorb moisture such as napkins, cottonoid rolls, gutta-percha canal points, Japanese root-canal driers, etc., require a steam chest that can be made moist or dry at will. The only practical instrument that meets all the requirements of the dentist is known as the Rochester Steam Sterilizer, made by the Wilmot Castle Co., of Rochester, N. Y.

Before proceeding with the few slides I wish to say that most of the data contained in the paper just read is taken from Jordan's General Bacteriology.



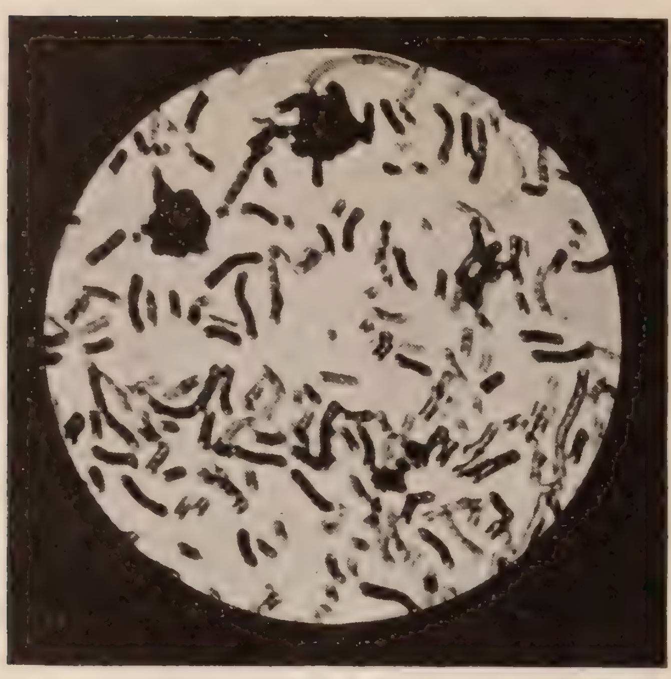
Slide 1

Slide 1: Here is a Mother Hubbard gold crown that I found in the clinic a few days ago in connection with a case of arthritis. The root canal was filled with a cone and some of the patent, dollar-a-bottle, root-canal filling material. In this case the crown was removed and there was no trouble in removing the cone, and when the cone was removed:



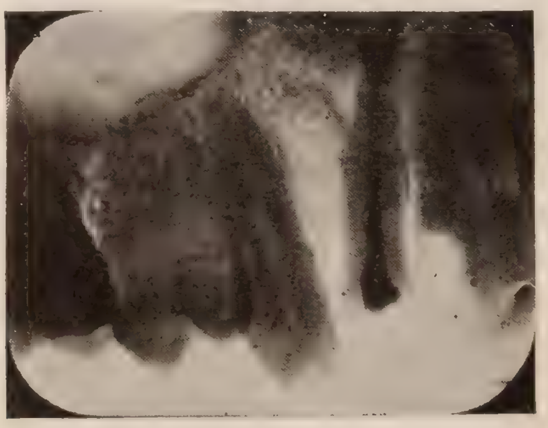
Slide 2

Slide 2: A wire was placed in the root and rayed, to show how far the canal was opened. When the wire was removed a sterilized needle was passed into the root, and



Slide 3

Slide 3: Is what we got after incubating, a mixed culture. The point is that any wire or instrument that goes in or about a devitalized tooth had better be put in the flame or sent immediately to the sterilizer. It should not be touched by the hands or any other instrument, because you see how you might infect the patient or yourself.



Slide 4

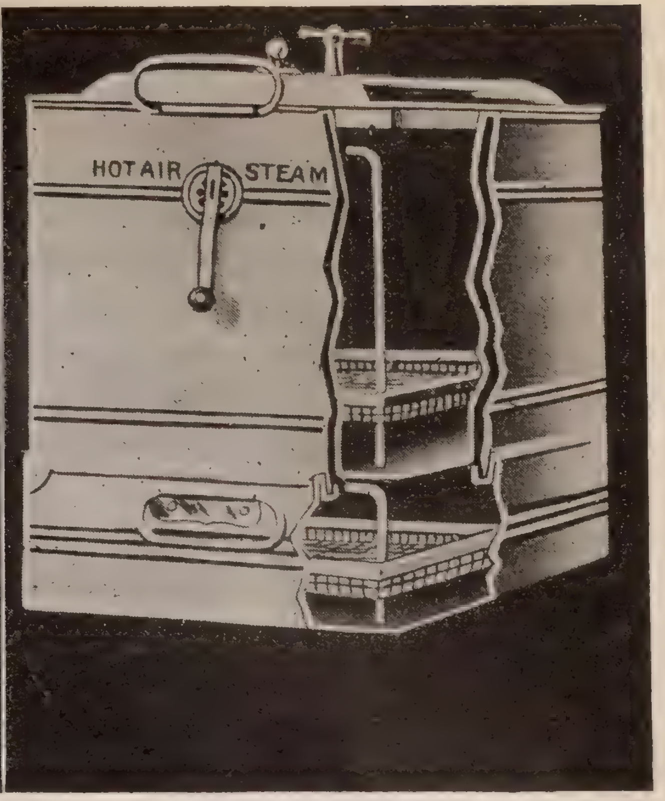
Slide 4: This shows the root filled after treatment.

Slide 5: In purchasing a sterilizer, you can get any kind of a stand you want, and it doesn't matter much whether you get a boiler or not. The sterilizer can be put on the floor, if you want to do so, or any convenient place.

Slide 6: This is an enlarged picture of the same sterilizer, with two racks or baskets. The base is to be filled about two-thirds full of water. Enough sodium carbonate to make a two per cent. solution is added.

Place articles to be sterilized in the racks in the chamber. Turn the valve indicator toward *Hot Air;* heat a few minutes then turn indicator toward *Steam;* the steam is forced in at the top at one end of the chamber

Slide 5



Slide 6

and out at the bottom at the other. After ten or twenty minutes turn the valve back to *Hot Air* and open the vent in the top cover; in a few minutes the contents of the sterilizing chamber will be dry. The basket is now re-

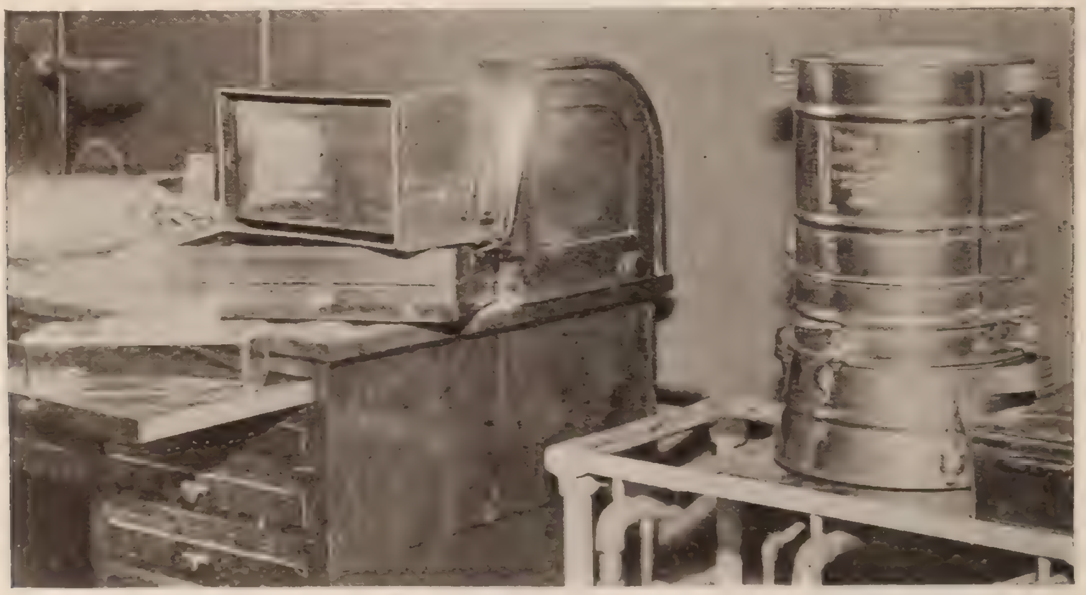
Slide 7

moved from the chamber and placed on operating bracket, being covered with a sterilized napkin. The above directions are about those given by the manufacturer.

Slide 7: This slide shows my own sterilizing outfit. I find one reason why many sterilizing instruments are bought, polished and set up and never used is because of the slight inconvenience in starting them. Do not waste your time or money on an electrical appliance. I have burned out half a dozen of them. It doesn't make any difference how many buttons, shut-offs and so on they have; if you can get gas, that is sure.

This is a gas burner. I had a pilot light put on, a small pipe that goes back three or 4 inches on the burner, and when the girl comes in the morning her first duty is to put water in the boiler and start the pilot light.

This is a still. I use it for distilling water, but if Ohio goes dry it may be used for other purposes. This is the boiler, it is as good as any for boiling certain steel instruments. So the girl uses it a great deal for that purpose alone, but you can do the same thing in the other one. This little pilot light keeps everything warm—not hot; you don't have to use matches or wait for the sterilizer to warm up.



Slide 8

Slide 8: I have taken the steam chest off here, and laid it over on the bench, to show the double chamber where the steam goes up through it. I have a little glass case here divided into small compartments. It cost fifty cents, and in it I place the paper points and gutta-percha points. The gutta-percha points under the heat would stick together if you allowed them to touch, so my custom is to lay a gutta-percha point and then a paper point and so on; they all go through the steamer into the basket, and then they are allowed to cool. You cannot touch gutta-percha points until they are cold, but as soon as they are cold they are in as good condition to use in a root canal as ever and they are thoroughly sterile, and you are not carrying any antiseptic drug with it. Once in a while I want to keep some of the instruments moist; then a glass dish answers the purpose.

Here is the container that holds the little cotton rolls that I am so prone to wrap or roll with my fingers. Every time any one catches you taking up cotton and rolling it in your fingers, and sticking it in a mouth you are attempting to sterilize, I think you should permit yourself to be arrested, and if that were the case I would be in jail many times, because I have had trouble breaking myself of that habit. If you will roll them in your fingers and then examine them, you will be surprised at what comes out of the culture plate. How simple it will be, once the habit is formed, to twist the cotton on an instrument in any manner you may wish, as many as you may need. Then put them through the steam chest; they come out dry and ready for any use, perfectly safe.

After steaming and drying the contents of the basket, place the basket containing the sterilized instruments, paper points, cotton rolls, gutta-percha points, etc., on the bracket; don't remove them from the basket except as they are to be used. Do not return any instrument to the basket; drop each used instrument in a receptacle for the assistant to remove.

DOES IT PAY TO PRACTICE DENTISTRY?

BY FRANK W. SAGE, D.D.S., CINCINNATI, OHIO

ONE WHO HAS been any considerable time in practice sometimes comes to suspect his fellow practitioners—some of them, at least—of a lesser degree of prosperity than externals indicate. Occasionally one will open his heart and say just what he thinks and believes, as to the promise and fulfillment of our profession. Possibly after all the most valuable speculations and testimonials may be looked for among the older men, so that I may quote some of them before I get through.

Here are some of the discouraging sayings of friends of the writer; this first of all, from the dean of a dental college: "Even if you are busy, there is no money in dentistry."

While still a student the writer received this (injudicious?) assurance from one of his professors: "After you have been fifteen years in practice you will curse the day you ever thought of learning dentistry." Still a third dental friend, a man in full practice in a large city, said, "You know dentists are generally poor."

While considering entering upon the study of dentistry, a dentist having a wealthy clientele, a man very industrious, commanding large fees, advised the writer against selecting dentistry, saying: "You could not choose a meaner profession." This gentleman a few years later became dean of a dental college.

. All four of the above were dentists of wide reputation; three of them of national reputation. Lest the foregoing should seem too depressing, let me add that another, a man of international reputation, still practicing in New York City, congratulated the writer, hearing he had chosen dentistry, saying:

"You are about to enter the bulliest little profession of all, believe me."

Let us get on and make an end of these discouraging revelations. I am rehearsing them merely to show that there is something wrong with dental practice, having in mind to suggest the remedy. We have to indict a man before we can bring him to trial; we must make our charges before attempting to force them home and suggest reform measures. Such "testimonials" as the foregoing cannot be disregarded; they may not reasonably be attributed to momentary discouragement, to the depression of the passing moment. Let us see about it.

Many of our patients have conceived that ours is a most lucrative profession. The writer recently heard a lecturer before the students of a law school say that the law was not a lucrative profession, that his own brother (a dentist) made more money in practice than most lawyers make. This man was a United States District Court Judge. I happened to know his brother referred to and further knew that he never made a gross income of over about four thousand dollars annually. I believe as a matter of fact the average lawyer makes far more than the average dentist; indeed, I am sure it is so.

In a book, the title of which I do not now recall, indicating the average incomes of men in professions and in clerkships or other occupations, it was stated that the average income of dentists in New York City was $1,000; which was cited as the average salary of policemen in the same city.

But away with all this. I am afraid if I keep on, your subscribers will lay this journal down and stop reading, not being able to endure the distressing rehearsal of failure or of inadequacy. Let us get down to a consideration of the whys and wherefores. That is what we need most to interest ourselves in, if these tales depress and discourage us. Let us consider what we are to do to be saved from this lamentable fate of numbers of men once prominent in the profession; Oh, yes, and prominent in dental societies, "little tin gods on wheels," as someone has called some class of men; I don't recall just who. Now then, let us get a move on and make a start.*

Why is it, we ask, that dentists are not more prosperous? The writer of this was a clerk when he determined (being rendered desperate by long hours and confinement), to become his own master to control his own time. I wish to say in passing that that end I achieved by entering the dental profession, and have had, so far as that feature alone is concerned, no occasion for regret. Glad I became my own boss—awfully glad. You fellows who have never been clerks don't know a thing about all this. But this isn't what I was starting out to say. Let's get another start.

What, we ask, are some of the elements which contribute to retard the dentist striving to gain a really lucrative practice? When I entered upon my career as a dentist I had this conception: That a dentist stands by a chair and fills a cavity with gold, occupying about half an hour, receives a three-dollar fee, dismisses the patient, and repeats the operation for a second patient. Some six or seven patients having been thus served, the dentist closes up shop and goes fishing (after placing the eighteen or twenty-one dollars in bank). Occasionally he makes a gold plate, pockets two hundred dollars, takes a week's vacation.

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*I want to say here and finally: I propose to use slang as often hereafter as I please, with no apologies. Frequently it happens that nothing else will at all answer the purpose. Go away, ever so far, if you don't like it.

That was about my conception. Of course as a young fellow I was a good deal of a fool, although you might not suspect it today.† What I really got out of my daily practice—oh, well, what's the use?

Now for an answer to the question I propounded above. Two disturbing influences or elements contribute to retard the dentist's efforts to get ahead and make a little money. Of these, one lies in himself; the other comes from without—from his patients. As to himself, first: A dentist may be industrious, plodding, conscientious, faithful to his patients' interests, yet may fail to accumulate money. How many do we discover going on year after year, barely paying expenses—how many not even holding their own? It is appaling when you come to look about you and inquire into facts; it is lamentable, distressing beyond words. Some of our leading men, men prominent in dental societies, never accumulate any money. I may cite instances later on and will consider that. I am not now going to talk about lack of thrift, directly, *per se*, but of other minor failings.

Dentists lose time and money through not thoroughly knowing dentistry. Such men are found frequently doing over operations which would have turned out all right if they had properly attended to trifling details in the first place. Take, for instance, so simple a matter as soldering a gold case, a full gold set or even a Richmond crown. We will say the dentist has been delayed and becoming a trifle flurried, expecting his patient soon, tries to solder before his investment is thoroughly hot—a most imprudent procedure, in these days of natural gas. Make a note of this, now and here: An investment which is to be soldered with an ordinary foot bellows and blowpipe, must have not less than half an hour of heating before the solder will flow at all readily. Even then a lot of blowing around the edges before directing the flame on the points to be soldered, must often be done. This is so important a prerequisite that it cannot be too much emphasized.

But our hurried friend, thinking he can force matters, turns his blowpipe on the gold surface and blows and blows. Seeing the solder crumbling to ashes, he blows harder—still harder. Presently he discovers to his consternation that the gold backing of his teeth has vanished. Moral: When solder begins to go to ashes, beware; stop instanter. Your piece is not hot enough. Some say a large gold plate may warp if overheated. I have not observed that to be a fact. At all events, if you find the solder does not flow, but curls up and deadens to an ash, *you have not got your case hot enough.*

Item number one: Time and money lost through being in too great a

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†What's that? Don't get fresh, young fellow!

hurry. Go slow with all soldering; do you hear? Then you will not burn up your piece; will not disappoint and inconvenience your patient.

A dentist's reputation is based upon his doing dental operations well. It must be obvious that his reputation is not enhanced by a patient's telling outsiders how he disappointed him or her through not getting it right. Therefore, it behooves the dentist to get things right the first time. It means reputation, and of course reputation means money. Do not make avoidable mistakes.

Here is another familiar instance of failure, due to the dentist's error of judgment, an error which means impairment of reputation: The dentist seats a gold inlay which he knows to be somewhat less perfect than he could wish; perhaps has shrunk at the cervical edge in casting. However, he reasons, the cement will fill the gap for the present. If that fails, and the patient discovers the defect, a little amalgam will repair all that. But let it be subscribed to as an axiom by every dentist that every return of a patient to have something that was wrong in the first place righted, is an impairment of reputation, spells loss of income. The dentist's salvation, in such instances, is often, to be sure, saved by referring to the inscrutable decree of a mysterious Providence. The pious dentist may explain that dental operations cannot be depended on to prevent future ravages of decay, Providence not permitting. Nevertheless, if it appears that your rival in practice who makes inlays that fit, has seldom to repair such ravages of time or of Providence, whichever it may appear is the case, you will inevitably suffer by comparison.

Moral: Don't presume too much on ascribing to a mysterious Providence, errors of your own making. Patients sooner or later will find you out.

I might go on filling pages with illustrations of how not to do dental operations, but these ought to suffice. Let us lay down as a general principle of practice not to pass off as perfect work which privately we know is not so. Better, much better, to inconvenience the patient by beginning all over.

Now we come to the influence the patient innocently and ignorantly exercises, in putting the dentist all wrong. Here comes a lady with a decay around a filling in, say, a central incisor, approximal surface. She tells you Dr. So-and-so, in whom she had implicit faith, filled that for her fifteen years ago. Sings Dr. So-and-so's praises, indicating (irrelevantly and exasperatingly) that she would have gone back to him, only he is dead. Now she wants you to fill that cavity once more, and to see to it—this by implication, not in expressed words—that you do it exactly as he did it. You experience a vague feeling of disquietude, something bordering on irritation, as she thus presumes to intimate that you might take lessons from her former dentist.

However, you say nothing, pondering the matter a moment. You explain that decay has so weakened the labial wall that it requires cutting away to insure against breakage after filling. Lady is firmly impressed (though she does not expressly say so) with the soundness of Dr. So-and-so's judgment, and wants you to be guided thereby. So you, being a weakling, instead of hammering into her head that she does not seem to pay any attention to what you have explained, instead of telling her kindly to dismiss a lot of preconceptions she has and pay strict attention to what you are telling her or else excuse you from the performance of the operation after the manner she insists on dictating—you, I say, go ahead and fill in under that weak enamel, just to please her, hoping it will not break away.

About two years later the lady reappears in an abusive frame of mind, as you instantly perceive, with a profane expression of countenance, indeed, such as even ladies nowadays, in this lady-cigarette-smoking-age, may betray. It is not necessary to recall all she says; it is a plenty. She indicates that you weakened that enamel by—oh, well, this is enough, isn't it?

Imagining yourself to be really guilty, not recalling the circumstances, you refill, charging only a nominal fee, or perhaps no fee. Two days later all the facts in the case suddenly recur to you. You say things none too pretty, but—meanwhile you are out of pocket. And, too, nine times out of ten, out of a patient, have you ever observed?

From personal observation, from inquiry, from deductions I have made, my conclusion is that dentists who manage to make more or less money over and above expenses, are men possessed of these characteristics: *They never perform doubtful operations; they regulate their patients instead of being regulated by them; they correct and persuade their patients instead of weakly complying with their preconceptions. They have certain rules and regulations by which they themselves are governed, and by which they insist on their patients being governed.*

Perhaps as good a way to demonstrate the value of such regulations as successful men practicing according to method make, is to illustrate by one more instance how lack of such system works.

Here comes a lady wanting an appointment for tomorrow at ten o'clock. You note the time in your appointment book, saying as she goes out, "I will be ready to wait on you at that hour." You have, however, given her no appointment-card to assist her memory. As she passes out she remarks casually, "If I am not here tomorrow you may look for me at the same hour the next day."

Now, what sort of an appointment is that? Yet occasionally a dentist may be found who will permit the matter to rest on such an indefinite understanding. He has virtually given the lady, without any return consideration, the choice of two days. What results? The lady fails to come at all; telephones that she will call and rearrange matters in person.

Many an angel in human guise will thus guilelessly impose on the too-compliant dentist. I do not presume on advising such a dentist what to do in the emergency; his case is utterly hopeless; advice would avail naught. He has denied himself the right to give tomorrow's time to another, even though it may mean money to him. Here is potentially at least, a distinct loss of time and of money. Yet some dentists are too mealy-mouthed to utter a peep in protest against such infringement of their rights!

Still again; as to never performing doubtful operations: A patient calls asking you to insert a temporary filling in a cavity you perceive may easily receive a permanent filling. You comply, charging, say, three dollars. Within three years you will have filled that cavity twice, and possibly the patient remarks, "I had supposed, when you charged me three dollars twice over, for filling this tooth, that I might look for better results. I do not care to pay out six dollars for something which is not going to last any better than that," etc.

Aggrieved, perhaps even truculent patient! If now you tell the patient the tooth should have received a permanent filling, he will, ten to one, blame you for not having emphasized your belief. Such patients ofttimes have this in mind: That the temporary filling will, after some unheard-of, miraculous manner, prove to be permanent, saving them both time and expense.

What dentists need to say far oftener than they actually do is something of this impressive sort: "This may be your busy time; you may not see the matter quite as I do, but I am working as much for reputation as for gain. You had better come later, when you can spare time, and let me do this right." Then, if you want to, daub in a bit of gutta percha, not too painstakingly, look a bit bored and indifferent, dismiss with scorn only half concealed, a suggestion of a fee—and hold the upper hand. The really worth-while patient who thinks he has bored you, will be moved by pride to make it all right as soon as possible. He will find his private affairs, after all, are not too pressing to permit of his returning and having that tooth filled right.

Write this down as worthy of remembrance: *You must get the upper hand of many patients from the start, or they will get the upper hand of you.* Not with malice prepense will they so do, but ignorantly, innocently, meaning you no wrong whatsoever.

It is remarkable how many dentists who excel in some one particular are weak in others. A high-class operator admitted to me that he was a trifle leary about soldering a piece. Hundreds of dentists even of long years' experience, hesitate through timidity to take plaster impressions. They will use impression compound in cases requiring the extreme of accuracy, such, for instance, as in getting a model for assembling the parts of a bridge. At that, they do not get good "compound" impressions, withdrawing the cup too soon.

The dentist who wants to make money must not do things simply out of regard for the timidity, or the wish to procrastinate, which patients often display. Daily such instances as this attract our notice: Comes a lady who has an old offender, a hopelessly-decayed root, past all surgery, which she wants you to stop aching. Can't have it pulled; oh, no, might make her cheeks fall in! You see that a nerve bristle passed through the pulp canal will probably relieve her pain, so instead of insisting on extraction, the only sensible thing to do, you try probing. Not so easy as you thought to get to that apex, but after fifteen minutes' fussing you succeed; pus wells forth, instant relief is experienced, and your patient goes forth rejoicing, promising next time to "have it out." No fee.

Have you ever had seven cases of the kind in one day, and did you ever stop to think how much unpaid-for time you have spent?

Doing things over again, not done quite right in the first place, consumes the time of numberless dentists. This refers to failures-in-the-mouth operations, in out-of-the-mouth operations. The late Dr. J. J. R. Patrick, of Belleville, Ill., once said to the writer, "Never permit a patient to dictate what shall be done; insist on being the doctor." Still, dentists who are disposed to be silent, taciturn, will often offend patients unnecessarily through not explaining their exact meaning. See to it that your patients understand the why and the wherefore of your opposing their wishes as to any disputed course of operation. If you fail to explain, the patient may attribute your resistance to preconception, or to obstinacy on your part. *But make the patient attend to your words.* The writer once heard Dr. H. J. McKellops, of St. Louis, a dentist of world-wide fame, a man of great firmness and decision, say to a lady patient: "You are not listening to what I say, madame; I must insist on your giving strict attention to my words. They are of vital importance."

If you are going to make any money in dental practice, you positively must not do little favors without a fee, just to accommodate the whim or the desire to postpone many patients display. Some dentists understand what I call the "fending off" principle in dealing with patients, better than others. A dignified office attendant is effective; such an attendant suggests that you are not too easily approached, and that it is going to cost something to get by her and consult you. Patients will not so readily run in asking for something to put in an aching tooth, then run out, without asking what is the charge, if you have a good girl or woman between you and the door. It pays.

The shorter, easier way often leads to error, to money loss and loss of time. Some dentists of years of experience, I have said, do not try to take plaster impressions. Consequently time and money are lost. Since I am allowing myself all manner of leeway in this writing, I suggest that an impression that sticks usually means a plate that will stick—not always. Read the journals, observe what other dentists are doing, improve, *improve.* Yet even herein is an element of failure; in believing either too much or not enough.

Again, as to the idiosyncrasies of patients, their whims, preconceptions, etc., as exhibited in other ways. Here comes a lady who wants you to do work for her daughter. Reminds you that you did several fillings for herself ten, fifteen years ago, and indicates how well pleased she is that they have lasted so well. Now, she asks, will you please see what is the very lowest you will require as a fee for putting the daughter's teeth in order. You make a careful, critical examination, taking, say, half an hour, and announce that fifty dollars will probably cover the expense. She looks astounded; says, "You charge a good deal more than you used to," and adds, "I thought it would be about thirty dollars." And so on, not to waste time in rehearsing the matter throughout.

Such applicants may invariably be set down as undesirables. The woman who has no more modesty than this will surely end by concluding to make it ten or fifteen dollars lower still, and will take the liberty of paying in installments, indefinitely deferred. You will have to write several letters to get anything at all toward the last. Send her away; you can better afford to wait for a more desirable patron. *Send her away*, I repeat.

Other writers have anticipated me in other items I might adduce; Mr. Harter, manager of this journal, for one. But even yet I have not quite had my say out.

A young dentist beginning to earn a rather handsome income, spreads out, as the saying is; buys things he might easily get along without, say, for instance, an automobile. Hundreds of cars are owned by dentists who might better—might better *not* buy them. (I am in danger of repeating some of the things Mr. Harter and others have said.) Listen to this, from an automobile salesman: "I believe the automobile to be one of the chief curses of the American people today. Thousands of men buy cars who ought to save the money for their debts." Think of that; from such a source!

A superannuated dentist said to me once (as he asked for a loan of ten cents): "I used to be the busiest dentist in this city. I spent my money freely, thinking my large practice was going to last forever." Shabby? I should say he was shabby!

It does not last forever. You who are the prosperous young men today in practice, will inevitably find in due time that a newer generation of dentists is getting your patients. I might name one dentist—and he was superior, too——who in old age sat in his office day after day, doing nothing. To be sure he was an octogenarian, but he still had good eyesight, still did fine operating, was always among the foremost to adopt improved methods. I called to see him one day, socially, and the manner in which he wrung my hand as I took my leave of him was pathetic, indeed. Man of national reputation.

The times are changing; dentists do not last as long in practice, even though they be first class; younger men take their places. Said one recently: "I used to say to myself, 'When I get to my sixtieth year I shall not be surprised to find my patients leaving me,'" and added, sadly, "they discounted my calculation by about ten years." However, the really capable old men always have a following, thinned out though it may be.

As to the auto: It seems to me that the craving for a car ofttimes would decline if the dentist could satisfy himself spending one-tenth as much, we will say, hiring one and taking a few excursions within a radius of forty or fifty miles about his home. I have been told this craving is like that boys and girls have for candy. Let such a boy or girl clerk in a candy store, eat his fill, and the feeling presently comes that "enough is a plenty." No end of people buy cars and tire of them before very long.

On full consideration I will not harrow up the reader's feelings by detailed accounts of dentists who never saved any money. Just a word as to a few. A dentist in a metropolis who was notorious for enormous fees, who was frequently the subject of sensational newspaper articles because of his exorbitant charges—to millionaires only, he having no other class of patients—died almost penniless. A man he was who was the center of attraction in dental conventions. Another, equally a sensation, wherever he appeared before dentists, a man reputed to make $30,000 a year, died penniless, absolutely so.

Let us heed these examples; save something, save something every month, every year. A thousand or two in bank, or well invested, is—or gets to be—as much of an attraction as an automobile, if dentists would only believe it.

In conclusion may I say there is this grain of consolation remaining for the dentist approaching old age, discovering that his practice is thinning out; if he is really up-to-date, even within a limited field, he will always have some following. Looking about him he sees ministers of the gospel forced out of their pulpits at fifty. Men in positions of trust and responsibility, in the business world, begin with good reason to tremble, many of them, at the first appearance of grey hairs. Perhaps they are conscious of declining vigor, strength, of weakening of their mental powers. Some day they receive their last pay envelope. The secretary of a large corporation told me he suffered this description of torture from the time he marked his fiftieth birthday until he was crowded out, literally crowded out, at fifty-eight.

What the dentist looks forward to with alarm is often a blessing in disguise. He finds most of his patients silently, unannounced, gone from him forever. Good! His strength has declined, but he can still serve the few, comparatively, who continue to believe he is the "only one." He requires less as to clothing, food, than formerly was to him indispensable.

But the secretary, bookkeeper, stenographer, clerk, must work just as hard, as a general thing, at sixty or seventy, as he did at thirty. It is either that or resign.

Let us be warned in time; let us save while we may.

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Prophylaxis

The most progressive movement in our work today is that of prevention. Oral hygiene and prophylaxis properly carried out is the greatest boon to our patients of anything that we have accomplished, but we have only just touched the border of this great movement.

Prophylaxis includes all dental operations; prophylaxis means accurate fillings; prophylaxis means accurately fitted crown bands; prophylaxis means automical articulation; prophylaxis means reproduction of tooth form.—*R. J. Rinehart, American Dentist.*

SOME THEORETICAL CONSIDERATIONS CONCERNING CHLOROFORM

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CHLOROFORM, once the most widely used anesthetic substance, has now been generally discarded in this country, although it is still widely used in Europe. In view of the newer and safer anesthetic methods such as ether, nitrous oxid and local anesthesia, there is now little or no justification for its use. Nevertheless, for experimental purposes, it is of great interest in providing a means of investigating not only the fundamental question of what the phenomenon of anesthesia is, but also the question of the origin of certain changes in the tissues which accompany to a more or less degree the use of every anesthetic agent. It is a consideration of these changes which I wish to dwell upon in this article.

It long has been known that after a prolonged administration of chloroform a condition, often fatal, may manifest itself from one to three days later, which has been designated as "late chloroform poisoning." This condition is chiefly characterized clinically by uncontrollable vomiting, the presence of excessive quantities of acetone, aceto-acetic acid, and increase of nitrogen in the urine, marked mental symptoms of drowsiness and coma, with or without preceding delirium, multiple ecchymotic hemorrhages and occasionally icterus. At autopsy, edema, fat infiltration of the viscera, multiple hemorrhages and necrosis of the central portion of the liver lobule, are conspicuous features[1].

There never has been an adequate explanation of these phenomena. Yet such an explanation would be of the utmost importance, since the same changes are found accompanying intoxications with a large number of agents, including other narcotic substances, arsenic, salvarsan, phosphorus; and most, if not all, bacterial poisons. It is unnecessary to emphasize the importance of even a partial explanation of not alone how the narcotics but also how bacteria produce their poisonous effects.

In a recent article[2] the author has shown that, at least in the case of chloroform poisoning, the evidence is strong that not only the necrosis of the liver but also the fat infiltration, the tendency to the production of hemorrhages, and the edema, are acid effects. With chloroform the responsibility probably rests chiefly upon hydrochloric acid, which is formed during the

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1—Excellent bibliographies on chloroform poisoning may be fcund in the following articles: Bevan, A. D., and Favill, H. B., *Jour. Am.Med. Assn.*, 1905, XLV. 691; Wells, H. G., Arch. Int. Med., 1908, I, 589; Whipple, G. H., and Sperry, J. A., Bull. Johns Hopkins Hosp., 1909, XX, 278.

2—Graham, E. A., *Jour. Exper. Med.*, 1915, XXII, 48.

destruction of chloroform within the body. Similarly, alkyl halides in general not only produce these changes but also are capable of yielding halogen acids (hydrochloric, hydrobromic, hydriodic, as the case may be) in their metabolic breakdown. These changes, however, are not limited to intoxications with those substances which can split off mineral acids, but they may follow the administration of any substance that can cause tissue asphyxia with its attendant accumulation of organic acids. Some of the evidence favoring this idea will be presented here, but for most of the details the original article must be consulted.

The fact that these changes are readily obtained with chloroform and only with difficulty by ether suggests that the difference in behavior of the two anesthetic substances must be due either to a difference in molecular action or to a difference in the products formed during their breakdown. Now, it is interesting that when chemically-pure chloroform is exposed to the sun light in the presence of oxygen, hydrochloric acid and phosgene are formed, as expressed thus:

$$CHCl_3 + O \rightleftarrows HCl + COCl_2$$

This oxidation occurs so easily that it has become necessary for manufacturers of chloroform for anesthetic purposes to add alcohol to it to prevent decomposition. Phosgene in the presence of water is readily decomposed into two molecules of hydrochloric acid and one of carbon dioxid, thus:

$$COCl_2 + H_2O \rightleftarrows 2HCl + CO_2$$

Therefore it is apparent that for every molecule of chloroform which is oxidized in the presence of water, three molecules of hydrochloric acid are formed. Furthermore this decomposition of chloroform is so easily performed that it occurs spontaneously. It is thus reasonable to suppose *a priori* that there is no reason why the decomposition might not occur under the conditions met with in the body, where there is available oxygen and available water. It is not difficult to imagine that the liberation within the body of so strong an acid as hydrochloric might induce severe disturbances.

With these facts and considerations in view, the hypothesis was subjected to a series of experimental tests which may be outlined as follows:

First: A study was undertaken of the morphological changes induced by hydrochloric acid, with special reference to the liver, since that is the organ which always shows to the most extreme degree the changes mentioned above. *Second:* Attempts were made to demonstrate free hydrochloric acid in the necrotic areas in the livers of animals poisoned with chloroform. *Third:* Observations were made on the relative powers to produce these changes of different chlorine substitution products of methane (e.g., dichlormethane (CH_2Cl_2), chloroform ($CHCl_3$), and tetra-chlormethane (CCl_4), which on theoretical grounds could be considered to yield different amounts of hydrochloric acid in their breakdown. *Fourth:* The inhibiting affect of alkali was studied. *Fifth:* Attempts were made to produce the typical picture of chloroform poisoning by other alkyl halides of the same type as chloroform, viz.: bromoform ($CHBr_3$) and iodoform (CHI_3), which might be expected to give analogous products in their breakdown with, however, the liberation of hydrobromic acid and hydriodic acid, respectively, instead of hydrochloric acid. *Sixth:* Experiments were made to ascertain whether or not morphological effects like those produced by chloroform can also be induced by alkyl halides in general, and whether these substances are decomposed in the body in such a way that the corresponding halogen acid is liberated. *Seventh:* A comparative study of the lesions produced by chloral hydrate ($CCl^3—CH <^{OH}_{OH}$) and chloroform ($CHCl^3$) was made, since the former substance yields practically no hydrochloric acid in its metabolic breakdown, although it contains the same number of chlorine atoms as chloroform.

When hydrochloric acid was given in suitable concentration, to rabbits and dogs, either by mouth or by injection into a branch of the portal vein, it induced all the changes in the liver which are characteristic of chloroform poisoning, except that the necrosis was at the peripheries instead of at the centers of the lobules. This difference in location of the necrosis was to be expected by the nature of the experimental conditions, since, owing to the arrangements of the blood supply, the acid entered the lobule at the periphery and therefore exerted its maximum effect at that location. The extensive edema which follows the administration of hydrochloric acid tends to confirm the well-known observations of Martin H. Fischer[3] on the imbibition of water by tissue colloids under the influence of acids generally. The production of hemorrhages harmonizes with the frequency of their occurrence after tissue asphyxia, with its attendant formation of acid. In a previous paper in which it was shown that the various hemorrhagic diseases of the newly born are probably expressions of an asphyxial process, I stated that this hemorrhagic tendency might be due to a "more fundamental and wide-spread change, as a result of which not only fibrinogen but innumerable other proteins tend to remain in solution, with the result that apart from diminished blood coagulability there is a great reduction in the firmness of the vessel walls."[4] The production of fatty changes in the liver with hydrochloric acid is in accord with an observation of Leathes.[5]

It is of great fundamental interest that, as shown here, by the use of a single simple experimental agent (hydrochloric acid) all those changes in the liver may be produced which are characteristic not only of chloroform poisoning but also of bacterial action and intoxications with many other substances.

Attempts to recognize the presence of free hydrochloric acid in the livers of animals which had been subjected to severe chloroform poisoning ing were carried out in the following way: Guinea pigs, which two days previously had been subjected to a deep chloroform anesthesia for about four hours consecutively, were anesthetized with ether, and while still alive portions of the liver were removed, cut into thin sections very quickly by

3—"Oedema and Nephritis," John Wiley & Sons, N. Y., 1915.
4—Graham, E. A., *Jour. Exp. Med.*, 1912, XV., 326.
5—"The Fats," London, 1910, III.

means of a Valentine knife, and immersed in baths of different indicators on the one hand and in baths of silver nitrate on the other. The only way by which free hydrochloric acid can be detected is by recognizing the presence of free hydrogen ion ($H+$) and free chlorine ion ($Cl=$). For the purpose of detecting free hydrogen the best indicator was found to be neutral red; and by means of this, in some of the pigs, a hydrogen ion content as high as 10^{-6} was noted, which greatly exceeds the amount ever reached in the tissues under normal conditions. For detecting free chlorine ion, the method of Macallum and Menten was used of observing the blackening of the sections after treatment with silver nitrate and nitric acid. By means of these two methods it was found that these areas contained free hydrogen ion and free chlorine ion. The presumption, therefore, is strong that these areas contained free hydrochloric acid. These results, however, cannot be considered conclusive evidence of the presence of free hydrochloric acid, since certain other conditions may be present to complicate the results. These are more amply discussed in the original article.

A study of other chlorine substitution products of methane should be of interest from the standpoints of determining (1): Whether they all have the power of producing changes in the tissues identical with those of chloroform, and; (2) Whether this property is proportional to the number of molecules of hydrochloric acid which could theoretically be derived from them. Chloroform, of course, is the tri-chlorine substitution product of methane. If, starting with methane (CH_4), we should outline a series of its various chlorine substitution products, we might expect, according to the theory, that those which could give the largest amounts of hydrochloric acid in their breakdown would manifest the strongest tendencies to produce the necrosis and other changes. Thus *a priori* we might expect the series to run in this order:

$$CH_3Cl < CH_2Cl_2 < CHCl_3 < CCl_4,$$

if all these substances were equally broken down in the body. The last three of the series (viz., CH_2Cl_2, $CHCl_3$, CCl_4) were selected experimentally as sufficient to test the tenability of this hypothesis. Outside of the body it had already been known that CCl_4 when heated with water can yield four molecules of hydrochloric acid, and CH_3Cl_2 can yield two. That chloroform can yield three molecules of hydrochloric acid in its breakdown has already been shown above. When these various substances were administered to animals by inhalation it was found that not only did all three possess the power to produce edema, hemorrhages, fatty changes in the organs and central necrosis of the liver, but that this power was shown in greatest degree by tetra-chlormethane (CCl_4) and least by dichlormethane (CH_2Cl_2). A comparison of the minimum fatal doses of the three substances when given intravenously to rabbits again bore out the same relationship. The following table shows the minimum fatal doses:

Substance	Minimum fatal doses per kilo. of rabbit	Minimum fatal doses expressed in gram-molecular concentrations
CCl_4	0.053 gm.	0.000344
$CHCl_3$	0.085 gm.	0.000711
CH_2Cl_2	0.147 gm.	0.00161

Thus it is evident that the power of these various substances to produce the extensive tissue changes paralleled the amounts of hydrochloric acid which they can give in their respective breakdowns outside of the body.

Alkali, if simultaneously administered with chloroform and in suitable concentration, ought to inhibit, at least to some extent, the production of the various lesions induced by chloroform if they are to be considered as chiefly acid effects. This was found to be the case. When alkali was given intravenously to dogs simultaneously with a protracted chloroform anesthesia, it was found that it protected the dog to a large degree from the production of the changes. Fischer's hypertonic solution of sodium chloride and sodium carbonate was very efficient in this respect when given in proper concentration. The illustrations show this protective action of the alkali.

Iodoform (CHI_3) and bromoform ($CHBr_3$) are so similar to chloroform ($CHCl_3$) in chemical structure as to suggest that they might have a similar power to produce the characteristic morphological changes of chloroform poisoning. Here, however, we should of course be dealing with an effect of hydriodic and hydrobromic acids, respectively, instead of hydrochloric acid, by the terms of the theory. As a matter of fact, not only do both of these substances induce lesions which are in every way identical with chloroform effects, but it is also possible to obtain some evidence that in each case the respective halogen acid (HBr and HI) is produced in the body. Striking evidence of this is found in the fact that neutral salts of these acids are found in large quantities in the urine of animals poisoned with bromoform and iodoform. Also, by examination of the necrotic areas of the livers of such animals with methods similar to those previously described in connection with chloroform, it was found that these areas contained a large amount of free hydrogen ion and were therefore strongly acid in reaction.

The readiness with which all of the halogen substitution products of methane induced the changes made it seem likely that the same results would follow the use of similar substances of the ethane group. Such was found to be the case with each substance used. The other substances used were ethyl chloride, ethyl bromide, ethyl iodide and ethylene bromide. Accordingly the results suggest that the power to produce edema, hemorrhages, fatty changes in the viscera and central necrosis of the liver lobules is a property of all those chemical substances which belong in the group of aliphatic alkyl halides. In connection with the theory being developed here, it is very interesting and suggestive that all aliphatic alkyl halides are capable of yielding halogen acids in the test-tube. That they do so also in the body seems to be shown by the fact that after poisoning with all of the substances which were tried, the neutral salts of the respective halogen acids are found in large quantities in the urine. Nef has brought evidence to show that the type of dissociation is as follows:

For chloroform, $CHCl_3 \rightleftarrows CCl_2 + HCl$.
For ethyl chloride, $C_2H_5Cl \rightleftarrows CH_3CH + HCl$.

Chloral hydrate, although it possesses the same number of chlorine atoms as does chloroform, yet has practically no power to produce these

PLATE 1.

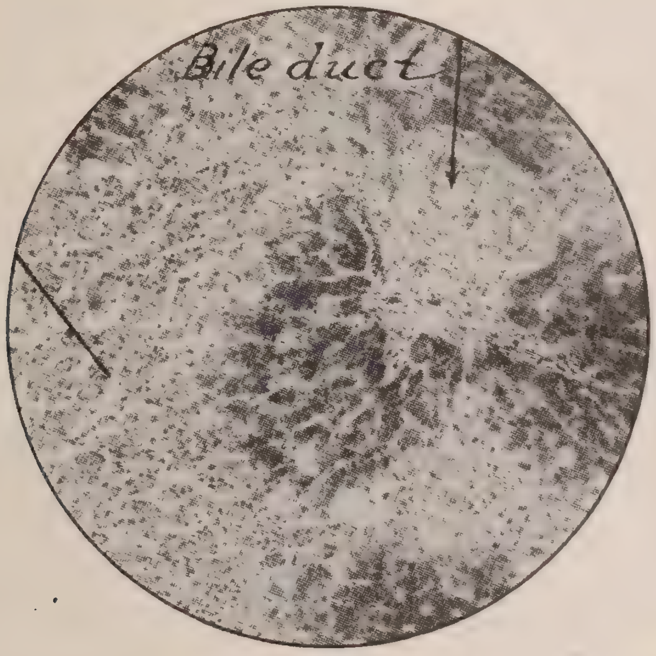

Fig. 1—Typical central liver necrosis produced by chloroform anesthesia for four and one-half hours in dog B. of Experiment 3. Nearly all the lobule is affected. Microphotograph X 83.

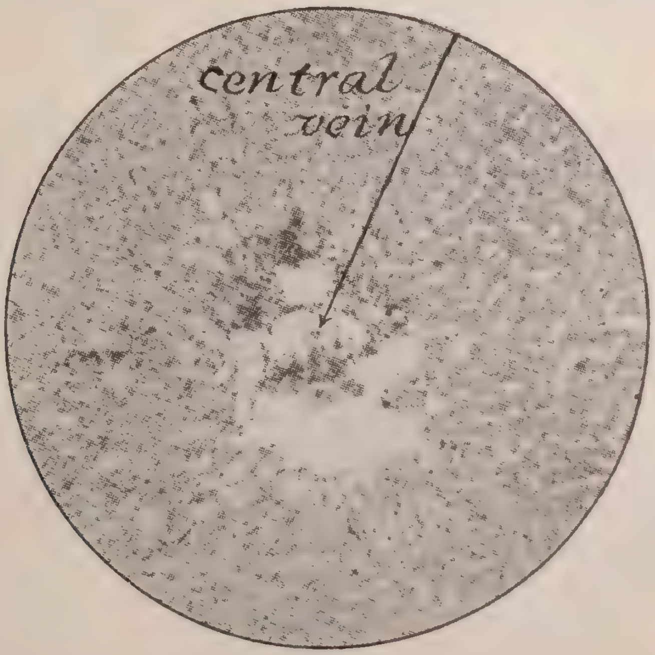

Fig. 2—Inhibition of necrosis by the intravenous injection of 150 cc. of Fisher's alkaline, hypertonic salt solution as shown in dog A. of Experiment 3, which had received chloroform for the same length of time as dog B. (Fig. 1). There is practically no necrosis. Only a slight amount of fat accumulation in the cells about the central vein has occurred. Microphotograph X 83.

changes. The reason probably lies in the fact that chloral hydrate ($CCl_3\text{—}CH <^{OH}_{OH}$) in its breakdown in the body is decomposed into trichlor-ethyl-glucuronic acid, and therefore is incapable of forming appreciable amounts of hydrochloric acid in contradistinction to chloroform.

Other substances to a less extent have the power of producing the various tissue changes under discussion, even although they have no power to yield a halogen acid in their breakdown. One of these substances is ether.

PLATE 2.

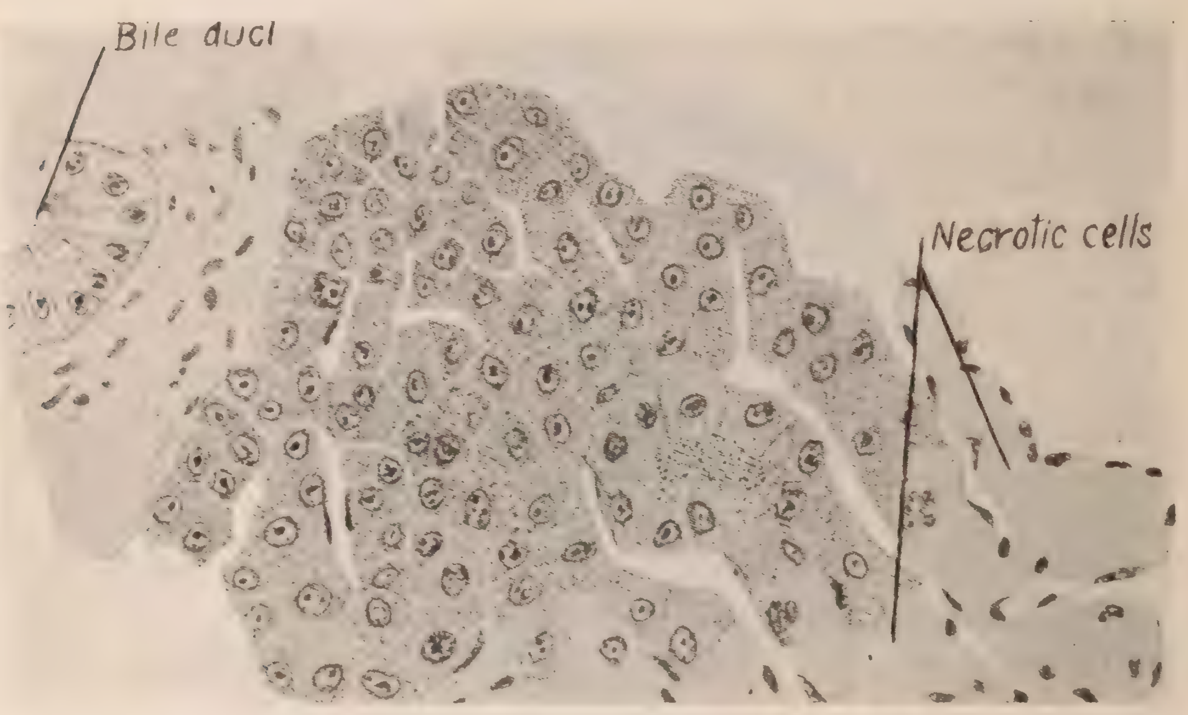

Fig. 3—High power drawing of liver shown in Fig. 1. The necrotic cells in the central portion of the lobule stain intensely with eosin. The nuclei of the parenchymatous cells have disappeared; and only those of the capillaries are evident. X356.

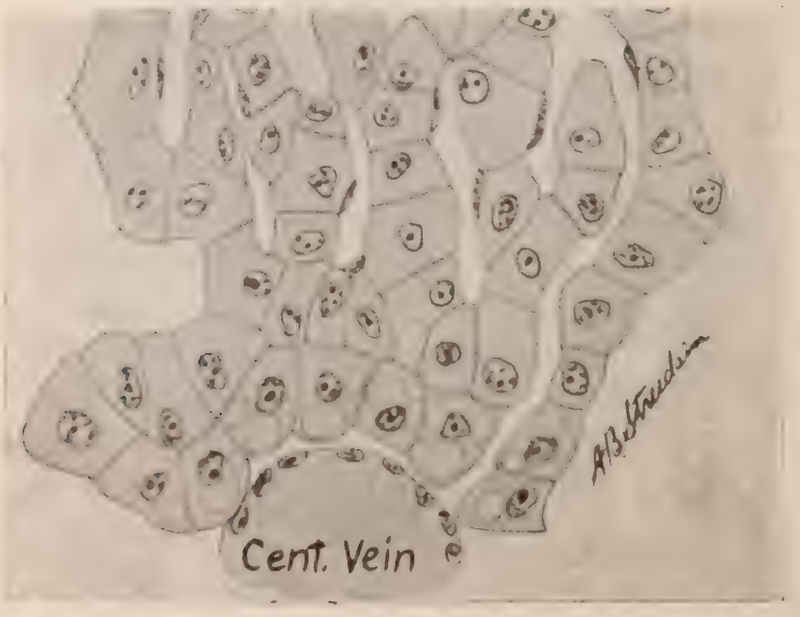

Fig. 4—High power drawing of the liver shown in Fig. 2. There is no appreciable necrosis; and only a moderate accumulation of fat has occurred in the parenchymatous cells around the central vein. X356.

But ether, like all anesthetic agents, interferes with the normal oxygen exchange of the cell and therefore induces a tissue asphyxia. In any condition of tissue asphyxia, no matter by what means produced, there is an increased production and accumulation of organic acids. Probably, therefore, the syndrome of edema, fatty changes, the tendency to the production of hemorrhages, and necrosis, is always an expression of the effect of an acid or of some agent which acts like an acid on the tissues.

THE CONNECTION BETWEEN DENTISTRY AND DEFENSE*

BY MAJOR P. S. BOND, CLEVELAND, OHIO

FORMER CIVIL GOVERNOR OF MORO PROVINCE, PHILIPPINE ISLANDS, AND FOR TWO YEARS ENGINEER TO GEN. J. J. PERSHING IN THE PHILIPPINES

I WAS INVITED here tonight to talk to you for a few minutes upon the connection between dentistry and defense. It is not necessary for me to add any details to the examples Governor Herrick gave you showing how an ulcerated tooth affected the destiny of two nations.

The modern conception of war is one that few of us appreciate. It calls into activity every artisan and practitioner of every art that we have knowledge of. The first requirement of a soldier is that he have an excellent physique and the connection between good teeth and good physique I think is so plain that it requires no explanation at all. When I was in the Philippine Islands I had a company of soldiers, and too many of them were on the sick list. I worried a good deal about it and came to the conclusion that their troubles were largely of an *in*-digestive nature, and I caused them to use more time at meals. I spoke to the doctor and he said, "Why don't you have their teeth looked after?" I sent the men to the dentist and I compelled them to have done the work that the dentist said was necessary. The result was remarkable—a reduction of twenty per cent. in the lost days from that cause alone. To increase our number of effectives by ten per cent. would be worthy of all the efforts that the dental profession in America can put forth.

I have not the power to appeal to your emotion, and I doubt if I would if I did have the power. I came here tonight in order to present a few facts to your good judgment and common sense. You have a great interest in the dental side of your citizenship and I feel no urging on my part is necessary to induce you to do all that your government will ask of you in that field of endeavor, but I also want to bespeak your support as citizens of this great republic, of the great movement in favor of an adequate defensive system. My little girl came home a week or so ago and was very proud of a square of parchment which said she had become a member of the Betsey Ross Society, organized for the purpose of purchasing the home of Betsey Ross and erecting a fitting monument over her grave. I thought that if Betsey Ross could speak from beyond the grave she would say something like this: "My fellow citizens, make that flag respected and then you may put flowers on my grave."

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*Address before the Cleveland Dental Society, and Cleveland Unit Preparedness League of American Dentists, April 2, 1917.

There is a line in one of our songs, I have heard it sung a number of times lately, which says, "Thy banners make tyranny tremble," and having sung it we console ourselves with the thought that it must be necessarily true. I wish you would stop and think of that one line—"Thy banners make tyranny tremble." Do they? What is it today that stands between the United States and tyranny? It is only the English navy. Did the banner of the United States make tyranny tremble in Mexico or did it make tyranny tremble on the high seas?

I think we are probably now in the greatest crisis in our national history. The Civil War was a great crisis, but the resources of the North were greater than those of the South, and the result, however delayed, could not be in doubt. I think that the future of this country as a free and independent state is threatened unless we make some provision to maintain our dignity. It is not alone a question of the present crisis. I do not know at the present time what the government of the United States intends to do in the matter of national defense; therefore, I make no criticism of what is being done or what is to be done. I merely state what are my own views as a result of years in the army and of talk with military men who have studied the situation and the needs of national defense. Suppose we did produce an army of five hundred thousand men, of what avail should that be if we alone were at war with Germany instead of being simply one of a dozen at war with her? We could foresee the present crisis with Germany, and we can foresee another crisis on the Pacific side. I believe the best way to evade an issue is to be prepared to meet it. I saw a very good cartoon today which points a moral and adorns a tale I am going to tell. It represents a gentleman holding his jaw (you know the familiar attitude), and looking very troubled. Up a flight of stairs was an office with the sign hanging out, "Dr. Compulsory National Defense, D.D.S.," and underneath the cartoon it said, "Looking up every alley before going to the doctor."

There is nothing dearer to the heart of the American people than the hope of getting something for nothing. That has been our national policy in defense. We have always hoped in some way we might evade the issue and not have to go to the dentist. National defense is just like everything else in this world that is worth having. You cannot get something for nothing in this world. National defense, like good dental work or good bridge work or building construction or anything else that is good, is worth paying for, and it must be paid for if we are to have it. When Mr. Edison was appointed chairman of the so-called Naval Consulting Board, people said, Now Mr. Edison will invent some machine which will defeat our enemies and keep our men from going to war!

International Agreements and International Law are based very largely on self-interests. The principles of International Law, so far as applied to warfare, are designed primarily to eliminate all those things that go to make war horrible without really contributing to the military success of the belligerent.

Consider what might happen in case we go into this war and decide to play the part of a craven instead of a man! As you know at the present time, outside of the activity on the Western front, the war in Europe is virtually a deadlock; at the present time each side looks forward to victory. Whatever may be our views as to the outcome, we know that both sides are weary fighting and both would be glad to find an honorable peace. We will suppose we go into this war to play the craven's part; in other words, to fight our own little war independent of the others. Germany would say to England: "What are your terms of peace?" And England would reply: "We want back the lost provinces; we want you to restore Belgium; we want the Straits and Constantinople; we want the Turk eliminated from Europe, and perhaps Asia." Germany would say: "Very well, we will meet your conditions; we will give you back the lost provinces; we will pay the expenses of the war to France, Russia and Belgium; we will be very glad to have the Turk extricated from Europe—on one condition; that you make a separate peace on behalf of the Entente and leave Germany to continue her war with the United States." I do not mean to say that Germany would suggest this, but I do believe if she thought England would accede to such a thing she would. England's attitude in that event would be dictated by her own interest and not by ours. It may not be to England's interest to permit Germany to acquire any territory, but she might say, "America can afford to pay; let her pay." That is not an impossible situation by any means. If we go in on the side of the Allies, naturally we cannot be faced with such a situation. If we prepare ourselves and make ourselves a nation of men and not of cravens, no such situation could ever arise, because no country would ever dare to make war upon us. I want to assure you that the call to arms may yet again be heard. America is about as well prepared for defense as a large fat oyster, with the top shell off.

The General Staff of the army has been urging preparedness, and all army officers have been urging it for years. Against whom do we prepare? The question was propounded to Gen. Wood in New York City, and he answered as follows: "Against what storm does the builder of a ship prepare when he builds his vessel staunch and true?" We are preparing to maintain our rights against whoever may wish to trample upon them.

Another argument that we have been hearing is the argument that preparedness leads to war. If England had been prepared in a military sense as France was prepared, the present European War would probably not have broken out. There are examples on both sides, but if you will look at those examples you will find the war usually takes the form of aggression by the prepared on the unprepared. The lion and the lamb do not lie down together and until they do I prefer to see my country the lion instead of the lamb.

I am very sure that the American nation is filled with patriotism which it is quite unnecessary to arouse, because it is already aroused. It is only necessary to direct it into the proper channels. I am trying to show you what are the proper channels. My views, I believe, are those held by every professional military man and, therefore, I feel they should have some weight, just as I feel that I should accept your opinion in matters of dentistry.

The situation of a modern nation at war is perhaps well illustrated in a title of a book by a German author on the subject of the war; it is called, "The Nation in Arms." A nation puts into the conflict every ounce of energy of which it is capable. This reminds me of a saying of Col. Roosevelt, "Do not strike a man if you can avoid it, but if you strike—strike hard." In this modern theory of war every man, every woman, finds his or her place; there is something for each one to do. We do not wish that emotional patriotism which causes all our young men to surge to the front and be slaughtered. We do not wish to conduct war on any such unbusiness-like basis as that; we wish to put each man in the place where he can perform the best service for his country, for only in that way can the whole strength of a nation be put into the conflict.

The greater the privileges conferred by a government, the greater the obligations of the citizens. We owe much to our country. You have had your attention called by certain other speakers to your obligations. The mere recognition of a duty does not insure its efficient performance.

You have heard the argument about resources and strength; you have no doubt thought very much about it. I wish to give you a single example to think of—the example of China and Japan. The population of China at the time of the Chino-Japanese War, was between three and four hundred millions; the population of Japan was about thirty millions, or about one-twelfth that of China. The greater part of the Japanese Empire is mountainous, and the inhabitants were barely able to earn a living. Yet when it came to a conflict between those two nations, China with her great population was perfectly helpless; Japan had converted a portion of her resources into military fighting strength and China had not.

I want to conclude by giving you just a very brief outline of the so-called system of Universal Compulsory Service, and why we think it is the most efficient and business-like method of national defense. We have heretofore always depended on the voluntary system. It always has failed us.

In the Revolution we turned out four hundred thousand men, and England never had more than seventeen thousand men collected in her army at one time; and yet you heard Governor Herrick say that America was a republic because of France.

If you want proof that the voluntary system is bad and that the universal system is the only efficient system, look and see what has been done by those great nations where the life of the nation is dependent upon the maintenance of an adequate military system of defense, Germany, France, Switzerland, Holland. They all have the same system. England never adopted such a system as that and her people are praying today to America to profit by her example and prepare while there is yet time. The voluntary system is both unfair and uneconomical. Those of you who had friends on the Border have had plenty opportunity to observe its workings. You saw men taken from all walks of life, and I know that many families were dependent upon charity during the absence of the breadwinner. Business suffered greatly and in some cases was ruined. It is unfair. It is uneconomical. It is inefficient. It does not put the citizen in a position to render the best service he is able to give. We do not set the bridge carpenter to do dentistry. There is room for every man in his own field or in some closely allied field. Now, to outline to you what this proposed system is:

I don't know exactly what period of training will be adopted by Congress; six months of training or twelve months. It is my opinion that six months is very much too little, and I do not believe twelve months is enough, but if we find whatever we adopt is not enough, we can extend it. We will give the men the minimum of training to fit them to meet the veterans of Europe. England has announced that those men not having at least twelve months of continuous training shall not be sent to the front. We will suppose on the first of July, or some set date in each year, all the young men who reach the age of, say nineteen years, are called to the colors. There have been estimates as to how many of these are physically qualified for service. About a million men arrive at the age of nineteen years each year. Say 500,000 would be physically and otherwise qualified. They would serve one year and a new class would come in every time an old one passed out, passing 500,000 into the reserve each year. On an average they would remain fit for military service until they reached the age of forty-five years; from twenty to forty-five years. Some would die before that time or be physically disqualified for service. Many would remain physically fit far beyond that age. For twenty-five years, what would that mean? We would have twenty-five classes of five hundred thousand men each, trained veteran soldiers; that is twelve and one-half millions trained soldiers. And I wish to believe that all nations will treat Uncle Sam with great consideration when they know he has twelve and one-half millions of trained soldiers at his call.

I have tried to give you the evidence that this is the only effective system. It has been adopted in Germany where scholastic and military training are combined. And whatever may be our attitude towards Germany we cannot deny the efficiency of her military system.

The two things we aim to inculcate or to teach or to secure in military training are, particularly, a good physique and discipline. I want to explain what discipline is. It is that spirit which induces a man to put forth all the moral, physical and intellectual energy of which he is capable in the accomplishment of a purpose, in the carrying out of an aim. The training and discipline is just as useful to the citizen as it is to the soldier.

In regard to physique. We take five hundred thousand young men in this country and force them to go to a dentist and then have the power to compel them to let the dentist do what is needed. It wou'd do a great deal to improve the health of the nation and you know it very much better than I do. We lose hundreds or millions of dollars every year through physical degeneracy and preventable diseases. Also there is the question of what enjoyment is worth. Someone asked me recently if I could capitalize enjoyment. I said it was worth all the individual could afford to pay, because I always have noticed we are willing to pay more for the luxuries of life than for the necessaries, and the greatest luxury that any man can enjoy is continued good health.

There has been a comparison made between military training and scholastic training. It is said that military training takes the man out of useful employment. He is withdrawn from the wage earners. The same thing is true of the boy in college. He is not adding anything to the wealth of the nation; yet who would think of depriving him of this education? And the same thing is true of the military training. The useful life of the man would be increased by more than the time he would spend in military training. We will teach him co-operative action, honor, truthfulness, etc. We have in this country compulsory training for the intellect. Why should we not have compulsory training for the physique, for character, good citizenship, duty, honor, flag and country?

AN HISTORICAL INCIDENT

COMPILED BY H. L. AMBLER, M.S., D.D.S., M.D., CLEVELAND, OHIO, 1917

The following is a synopsis of an article in "The Underground Railroad" by William Still, Published by Porter and Coates, Philadelphia, 1872, (William Still was colored).

"SAM" NIXON, alias Dr. Thomas Bayne—his place of bondage was in Norfolk, Va., where he was held to service by Dr. C. F. Martin, a dentist with whom he learned dentistry and was often required by his master to fulfill professional engagements at home and at a distance. In the mechanical department, Sam was called upon to execute difficult tasks. His master's practice amounted to $3,000 per year, and Sam claimed he earned $1,000 of that amount. Sam was a ready reckoner and apt penman, so he had to keep the books, notwithstanding he never had an hour's schooling, but Dr. Martin was not opposed to his learning to read and write, and he always treated him well.

Sam had been sold several times in his younger days and keenly felt the smarts of slavery, but the doctor did not keep him so closely confined that he had no time to attend, occasionally, to outside duties, so he was active as an "Underground Railroad" agent and he believed slave holders were watching him and if he remained he would find himself in "hot water," so he decided to leave. He knew the captains who were in the habit of taking similar passengers, and feared they might not be able to pursue the business much longer, so he kept his movements private, not telling his wife and child, who were slaves owned by E. P. Tabb, but he thought that he could better succeed in securing his family after obtaining freedom for himself. The captain had two other male passengers to bring with him for whom arrangements had been made for that trip. They were at the disposal of the captain of the schooner which was to bring them out of slavery. Aware of the consequences should he be detected, the captain secreted them in the usual manner and set sail northward, intending to land in Philadelphia, but he landed them on the New Jersey coast near Cape Island and told them how to reach Philadelphia, as Sam had friends in the city.

On their way they reached Salem, N. J., where they were discovered to be fugitives and were directed to Abigal Goodwin, a Quakeress and Abolitionist, and friend of the Vigilance Committee, of Philadelphia. When she heard his story, especially when he told about being a dentist, she suspected he was an imposter, but she was persuaded to render him assistance. In the meantime she received a letter from Philadelphia, inquiring about the fugitives and telling her why they were in Salem. In her letter of March 3, 1855, she said in reply: "I do not believe any of them are the ones thee wrote about. They had no money but were pretty well off for clothes. I gave them $4, and they will meet with help on the way. There has been a slave-hunter here lately for a woman, and he tracked her to the Alms-house, and later will take her away. I advised Sam to hurry on to Canada and he has left. He would not tell where he came from, but says nobody can make a better set of teeth than he can. He named nine more slaves who may come here soon. He was dressed in a fine broadcloth coat and overcoat, and has an active tongue in his head."

In due time Sam reached Philadelphia, where he met a welcome, but in a few days he went to New Bedford, Mass., and resolved to stay and work his way up to an honorable position in dentistry. So he adopted the name of Dr. Thomas Bayne, and began to practice, and as colored men were voters and eligible to office, he took an interest in politics and after four years he was a member of the city council. He was a ready speaker and strictly temperate. In a letter of June 23, 1855, he says: "I see the Underground Railroad is still in operation, and expect to see some of my friends soon from Norfolk, Va. Times are hard in Canada and two of my friends have come to New Bedford. Everything is high and wages low—owing to the war. My business is increasing since I got an office at 66½ William street." In January, 1860, he says: "My office has burned up, but I have the books you kindly sent me and they are just what I needed, but I want a medical dictionary, physician's dictionary and an anatomy." In 1861 he says: "Any books of dentistry or medicine will be thankfully received, as I need them to prosecute my studies; office 22 Cheapside, opposite city hall."

"Dr. Thomas Bayne" continued to labor and improve his mind until the Civil War removed the institution of slavery from the nation; then he went to Norfolk, Va., from whence he had escaped. When the time came for elections he was an aspirant for a seat in Congress, and in running for it he was a difficult candidate to overcome.

When he escaped in 1855 he was thirty-one years old, of medium size and purely colored, with a full share of self-esteem and pluck.

SOME IMPORTANT ETIOLOGICAL FACTORS UNDERLYING MALFORMATIONS OF THE ORAL CAVITY, THE FACE AND THE BRAIN*

BY WESTON A. PRICE, D.D.S., M.S., CLEVELAND, OHIO

I AM VERY HAPPY to have the opportunity to study with you a little while this evening the problem of the deformities, and as we study the deformities we must necessarily have in mind the normal development if we would see the abnormal. I am going to ask you then to consider with me for a little while some of the normal processes of development. What are the laws of heredity? What is heredity? Why am I what I am? What has made me such as I am? Is it largely the influence of my father or of my mother, or were they rather secondary? What is the great law of normal development? What are the laws of development? If we were to have asked that question twenty years ago we would have found, following the leadership of Lamarck, that the answer would have been: "Use and disuse," and they would have pointed to the giraffe and would say, "See the giraffe with his long neck; that long neck for reaching those beautiful succulent leaves on the tall trees is nothing more nor less than the result of his stretching his neck to reach the leaves." Therefore, the answer would have been, "Use and disuse." And if my ancestors would have been studied they would have said, "Necessarily the qualities which present themselves in this person as character are such because of use and disuse." A little later if we had asked the authorities as to the laws of heredity they would have said, "No, not the laws of use and disuse, but rather the survival of the fittest, natural selection in other words." And we would have had a leader like Darwin pointing to the swine and he would say, "See the splendid herds of swine we have today; they are the result of picking the fittest of this flock and the fittest of that flock and therefore we have by natural selection developed the ideal, the best that we have today." If we were to ask a later generation than Darwin among the biologists: "What are the laws of heredity?" they would have told us, "No, not the effect of use or the effect of disuse nor the effect of the selections of the best qualities and the best specimens." They would have said, "It is mutation now; mutation," they would say, "will be the development of some sudden changes in the line of descent where suddenly a new character comes in that has not been present in any of the former members of the line because of that coming in of a new element which transfers to its succeeding generations its characteristics, we have the development of what would be known to be the highest and more perfect forms." And if we were to ask some of the best biologists of today we would find them taking a still more advanced attitude and they would say: "Not any one of these three, perhaps some of all of these three, but besides all that there has been developing in the human body a tendency to a mutation form, but a preparation for that mutation form going on through a long series of years or through successive generations; a preparation, so to speak, for a new type that is to come out." So that today we would have to harmonize all of those four theories. And as we come to a study in detail of the mechanisms that underlie heredity, I think we will see quite largely how those processes can be harmonized and we can understand in part, if not in quite a large part, where one begins and another leaves off.

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*Stenographic report of a lecture before the Iowa State Dental Society.

I believe you will have to have in mind normal heredity in order that you may think of a diversion from normal heredity, for if we are going to study the deformities we must know the normal in order that we may understand the abnormal or the causes of the abnormal. I believe as you are thinking of the normal or normal processes of heredity you are thinking of the great underlying principles. We can express the three great foundation stones: One is that characters are inherited as units and traits may be divided up into ever so many characters and we will inherit any one of these traits, we will inherit any of these so-called character units, units of character, independent of all other units of character that we may possess. You have that then as one of the first of the three corner stones, that we are able to inherit units of character and the divisions of traits. Next, we do not inherit character at all; we inherit something that determines character. My son does not have my nose, for I still have my nose myself; he has a nose like mine, not because he inherited my nose, but because he inherited something from me that determined that he should have a nose of the same type. In other words, he inherited a determiner. That is the second. Now you have those two in mind; first, the inheritance of character in units; second, the inheritance of determiners that determine character. Now third:

My son does not inherit anything from me at all; he has a nose like mine simply because he is a chip off ot the same block, we are brothers by different mothers; he is a part of that same protoplasm that I am a part of which has come down through our ancestry and I add almost nothing to that protoplasm as I pass it on to my son. I may take much from it, that is the important thing to remember, but I can add very little to it. Then remember that the parents transmit as you will see later, almost nothing that the parent does not inherit.

You all have watched the dog as he comes in and lies down on the mat, how he turns around three or four times. Why? He is not afraid of venomous serpents, or reptiles or anything that is going to bite or injure him. He knows nothing about that, but his ancestors did. His ancestors knew perfectly well that there were venomous serpents in the grass and during all the thousands of years, the many, many thousands of years that the foxes and wolves have lived, they have known of those venomous reptiles and they have learned to be wary of them, and have always looked about carefully before lying down, and that has been transmitted down, but not because this dog's father or mother did it, but simply because they each are a part of that far distant practice. And you have all ridden behind a horse or upon his back and you have galloped or trotted through the country; suddenly something flitted out from behind a bush—a piece of paper or something, and your horse took to his heels; before he knew what was happening to him he was on the go; he had presented his heels and he had taken the attitude of escape. In other words, he had reacted to natural instinct for self-preservation; that is the thing to remember.

You all have watched the cat, and have seen a scrawny little kitten come out of the alley and a great big vicious dog come along by the alley, and the little kitten that was only a mouthful for the dog, instead of running, what would it do? It would turn and offer fight. That reminds me of a back-yard incident. Mrs. O'Riley looked over the back fence at her neighbor (she had been reading a little about ancestry), and she said to her neighbor, Mrs. O'Rourk, "Who did your ancestors spring from?"" Oh, be jabbers, I would have you understand that they never sprung from nobody—we always spring at them." Now there are people doing exactly what these animals do; some spring away and some spring toward others. The dog has his characteristics. The horse has his characteristic of self-preservation because all during the past centuries and æons of time the feline foes of the horse have been springing onto it in its unprotected state, and the horse had only self-preservation by escape and he presents his heels for a defense and instinctively when the paper flits out from behind the bush he turns his heels and takes an attitude of escape, not because he had seen what was coming, not because he thought it was a cat, but because he has inherited that fear from a far-distant past. And just so the feline type had their preservation in their splendid claws and when they were attacked there was no enemy of the forest that they need be afraid of. You know how the big dog will run from the little kitten because he dreads those awful claws in his face. That is, then, an illustration of how the far-distant past comes down into our lives just as it does into these horses and these dogs and the kitten.

I wish we might for a few minutes study a little of the behavior of inheritance. Why am I like my father, or like my mother? I have said because determiners have come into my life and have made me so. These determiners are what? They are probably enzymes. They are probably a great deal like the digestive enzymes we were speaking of last night, protoplasmic forces infinitesimally small but as they divide up and go into every cell of the body, you and I represent certain protoplasmic force and energy that has been accumulating for thousands of years, transmitted to us and to which our father and our mother added almost nothing, but they transmitted it to us; and it is an enzyme of such sensitiveness that at certain periods it is so delicate that it can be destroyed or diverted and its whole tendency changed. I am what I am as regards the past simply because none of my ancestors have destroyed that protoplasmic force that was coming into my life.

Now the next natural question that will come up will be, what is the effect of a mutilation of my body on my offspring's body? Will the fact that I have a contracted arch make a contracted arch for my boy or will the fact that my body is deformed make a deformed body for my boy? I have said, and it is a thing we want to get clearly in mind, that my body has almost nothing whatever to do with my boy's body. That seems like an impossibility, but you will understand it a little later. I do almost nothing but simply transmit that protoplasmic force. I can very easily destroy the enormous potentiality that is wrapped up in that protoplasm in just a few moment's time by many methods, but the thing that we do when we have a normal inheritance, a normal heredity, is to simply follow nature's natural development, and there is developing in us mechanically almost exactly what is taking place in the plants. Now we must look into heredity then as having some very definite laws. What is the nature of those determiners we are speaking of? What are they? I have said that they were probably enzymes that come over with the protoplasm that has helped to make up the first unit cell. Why is it, for example, that my son has light hair? His father had light hair and his mother had light hair. Why didn't my son have dark hair? Why is it that you have dark hair and your husband has dark hair, and your son has dark hair; and perhaps you have got two or three or four sons that have dark hair, and you have one with light hair? There is a natural law. There are two kinds of determiners, rather two effects of determiners upon my body. I may have determiners that determine a certain quality which we will call positive determiners, and I may have an absence of determiners. I may transmit a protoplasm that has certain determiners lacking. Therefore my son may have light hair because of the absence of a determiner for pigment. That is the thought. And if we will take that one thing of color of hair or color of eye and follow it through in detail I think you will soon get the picture of the whole thing. We will say the presence of a brown pigment in the eye is the expression of a positive determiner for brown pigment. A blue eye indicates that there was no determiner for brown pigment. Now then, supposing that the father and the mother both have brown eyes and their parents both have brown eyes. Would it be possible for them to have a child with blue eyes? No. On the other hand, supposing one of the parents had brown eyes and the other blue eyes; what would be the effect? Brown is the expression of a positive determiner for pigment and brown would dominate so that probably two or three of the offspring would have brown eyes and the others blue. Let us follow it out; I want you to get it. It is the keynote of the whole situation, for what applies to the brown pigment in the eyes applies to the whole process of heredity. Let us suppose that both parents have a determiner for brown pigment; then the offspring will get a determiner for brown pigment from both parents. Just try to get this word, they have the determiner in duplex; that is not a hard word to remember, and let us remember it; they will have that determiner in what we call duplex. Now, let us suppose that one of the parents has brown eyes and the other has blue eyes. The offspring would have from one parent a determiner for brown pigment, but would not have it from the other. Therefore, instead of having the determiner twice, or in duplex, they would have it just once, or in simplex. Now, the mother having that determiner in simplex would produce in her children half with blue eyes and half with brown eyes. That is the way it goes. Supposing a person having a determiner that was in simplex would marry one that was in duplex; what would their offspring have? Three would have brown eyes and one would have blue eyes; we have that law running right through.

Here is a very fundamental law and it is not a difficult one to remember, and it is called Mendel's law. It applies just the same to plants as it does to animals, and it is that, when you produce from a combination you have three different kinds of offspring; one will be a hybrid, a mixture and a blending of the two; and the two others will be like either one of the two parents, and if you will look about you you will see how it works out. Here is one child not like either parent. It is not like both, even; it is a hybrid. Here is a boy just like his mother and a daughter just like her father, which happens so often, but it may not always cross the sex. There is the fact. That is Mendel's law that occurs in all biological processes. There will be from every combination a hybrid, which is a combination of the two, and for every hybrid there will be one for each one of the parents making that hybrid. That, then, is Mendel's law. That is something you ought to remember.

As we go to a study of these deformities we will come back to the application of this thing that I have been speaking of; we want to study the types of deformity that comes to your attention and mine. What are the serious deformities that come to the dental profession? I would not say they were confined at all to contractions of the arch. I think they are largely facial and mental. It is very important that we get clearly in mind the things that determine those defects that have to do with bone development and that have to do with the glands of internal secretion and functioning development.

If we might have the slides at this time and have the lights out we will take up this problem in some detail. The first that we will see will be a boy with defective enamel of his teeth. We call it hypoplasia of the enamel; it has so often been spoken of as Hutchinson's tooth, or syphilis tooth. It is not Hutchinson's tooth. It is due to a disturbance of nutrition during the early period, usually of babyhood, and it can be produced with syphilitic infection, it is true, but in some two hundred cases that we have histories and models of, we find that nearly all have no history of syphilis. It is then not the type of deformity that would be due to heredity. It is an acquired deformity. This is a characteristic hypoplasia due to faulty baby feeding. This boy and his sister both have teeth that are the shape of screw drivers—thin and flat on the end but thickening as they get farther down, and this type of deformity is quite common and can be traced to baby feeding.

(*To be continued*)

PRESIDENT'S ADDRESS*

BY T. IRVING WAY, D.D.S., CINCINNATI, OHIO

AS WE ARE ASSEMBLED to take part in the proceedings of the annual session of this society, it is well for us to recall to mind that company of earnest, zealous men whose efforts of half a century ago called into being the Ohio State Dental Society, and who, throughout the years following, strived to elevate and advance the interests of the profession by their unselfish and generous contribution of time and talent, and made it possible for us to enjoy this splendid organization today.

That the same spirit of unselfishness, the concern for advancement, the desire to contribute to the betterment of the conditions of mankind is greater today than at any time in the history of the profession, is of much moment.

During the year just closing, it has been my privilege and pleasure to visit many of the component societies throughout the state, and it has been most gratifying to become acquainted with the members, note the cordiality and observe the community of interest of the membership. So long as this spirit of unity and the desire of the individual member to further the interests of the society obtains, we may feel assured that the Ohio State Society will continue to be, as it is today, the peer of any state organization in the dental profession.

Continued growth must come through stimulation—those problems which affect not only the state and local societies, but the individual as well, are the stimulus to vigorous growth. The live issues of today, whether pertaining to the science and art of dentistry or those problems which have to do with the physical, moral and social well being of mankind, are of equal interest to us.

It has been the endeavor of your program committee to call to our assistance those men of recognized authority on the subjects which they will present, and each one brings to us a message full of interest and instruction. In the presentation of the several lectures and the conduct of the clinics, you will note the departure from the usual program arrangement, which it is hoped may make for a satisfactory and beneficial meeting, and in results attained "fill the unforgiving minute with sixty seconds' worth of distance run."

Those unfortunate mouth conditions which we recognize as prime factors in producing not only local but systemic disturbances, requiring the removal of a few teeth, bring to us many cases for replacement in the form of "partial dentures." Appreciating the importance of "pulp and tooth conservation," mechanical therapeutics and prophylaxis, we should be alert to employ the best methods with their attendant technic.

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*Read at the Ohio State Dental Society, Dec., 1916.

In dealing with tooth roots and their bone environment, the verifying or disproving of diagnoses is largely dependent on the radiograph. To secure all the information available pertaining to this important adjunct should be the concern of every member of the profession.

That the oral cavity forms an important part in the economy of maintenance and repair, and its state of health contributes to, or is responsible for, diseased conditions in remote parts of the body, has long been recognized, and in the light of recent investigation in which our own research workers have contributed much valuable information, it is with great concern we await the results of intensive research that shall solve those problems that have to do with the health and comfort of those we serve.

Happily that day has passed which knew the dentist as the "mere filler of teeth and maker of plates." Keeping pace with the best in the art of dentistry, he of today must measure up to the requirements of dealing intelligently with the diseased conditions coming within his field of operation, and as a consultant co-operate with his medical brother.

So long as dentistry is practiced, the larger part of service will be reparative and only through the education and co-operation of the patient as relates to mouth health, will preventive dentistry be realized.

In the matter of education and oral hygiene as it relates to this society: The desire of this administration has been to see established the foundation on a permanent basis of an organization that will increase in attainment with each succeeding year. It is a strange commentary on the situation that this problem which we all recognize and agree affects the many, so vitally engages the serious attention of the few.

The report of the chairman of this committee is direct and comprehensive, and the recommendations it carries are made after a careful survey and study of the situation. The efforts of the committee have been along the lines of constructive work, and the results attained in the developing of the "Educational Exhibit" we feel assured that you will agree has made substantial progress during this year.

The planning and construction of this splendid educational feature has been an intensive and persistent effort on the part of the chairman, who, I am glad to report, has been assisted by members of this society, who have given freely of their time and ability to the partial completion of the work as it is today. I would be remiss, indeed, if I failed to accord to Dr. Morris Gruenebaum, of Cincinnati, our appreciation of the unselfish contribution of his talent without which many special features of this educational part of the work would not have been possible. The exhibit and the several sets of the slides for illustrating lectures for use of the component societies should create a new interest, stimulate and increase the desire of individual members and local societies to make a more determined effort to advance this important branch of the activities of this society.

Since our meeting last December, several matters of interest and importance have occurred. The conflict raging in Europe, with its attendant misery and desolation, has emphasized two facts as relates to army dental service: The necessity of a sufficiently large and efficient dental corps to give thorough and careful treatment to the men on enlistment, insuring comfort and higher efficiency, and the ability of members ot the corps to deal promptly and successfully with the infinite variety of injuries coming under their care; and it is with keen interest we read of their skill and resourcefulness.

It is with a degree of interest we note that during this year in the reorganization of the army, Congress recognized the necessity of adequate dental service and enacted measures relative to the army and navy dental corps which place them on a plane more in conformity with the dignity of the dental profession and make for a higher efficiency in that branch of service.

In 1901 the army dental corps was established on a contract basis. After ten years (1911), the grade of First Lieutenant, which required three years' service as acting dental surgeon to attain, was authorized by Congress. Thus, after the corps had been established fifteen years, we had only one grade. The recent enactment provides for:

> *a.* Three grades with actual rank; First Lieutenant, Captain and Major in both the army and navy corps.
>
> *b.* A Dental Section of Officers Reserve Corps in the army with the benefits of the three grades.
>
> *c.* Under a ruling of the Comptroller of the Treasury, all former service as contract or acting dental surgeon is counted in computing length of service for promotion and other purposes; also under certain restrictions, members of the army corps are entitled to the pay of mounted officers in the medical corps.

In securing this desirable legislation, the efforts of the legislative committee of the National Dental Association was supported by the profession and many members of Congress. The greatest aid, however, was rendered by Senator Atlee Pomerene, of Ohio, and we accord to him our appreciation of his earnest and successful efforts in behalf of this measure.

JOURNAL

The action of the National Dental Association in authorizing the publishing of *The National Journal* on a monthly basis and the provision for its maintenance, whereby each member of the association will receive it regularly, is recognized as a necessary aid to the carrying out the work of the association. An excellent journal, as a quarterly, it was not equal to the demands upon it. As a monthly journal it will measure up to the requirements of an official organ, prove a valuable addition to our literature and should be accorded a hearty welcome by every member of the profession receiving it.

As we contemplate the results of great endeavor and the rich attainment of men who are revered for their gifts to mankind, it is fitting that our minds turn to one who was dentistry's greatest benefactor, whose long professional life was one succession of achievement for the betterment of his fellow men. In honoring the memory of Dr. Greene Vardiman Black, the dental profession honors itself; and we hope that this society will exercise that rare privilege by a suitable contribution to the memorial fund.

February 7th of this year marked an epoch in the history of dentistry. On that date the home of the Research Institute of the National Dental Association was formally opened, and the splendid building in Cleveland dedicated to the work of the Research Institute.

You are so thoroughly familiar with the history of the research work from its inception to the present practically completed organization, that any argument or endorsement from me seeking to strengthen its position would seem unnecessary.

When we contemplate this splendid organization with its corps of thirty workers distributed throughout the various cities of this country, devoting their energies to the solving of the many problems which so vitally affect humanity, it is with great concern we realize the necessity of the loyal support of every member of the profession. That Ohio has been to the fore in its support is a satisfaction to the members of this society. The man who has made this noble institution a reality and given unselfishly and devotedly of his time and substance to its creation, Dr. Weston A. Price, is one of us. This society and its members have been privileged to furnish substantial support to its advancement, and the demonstration of our faith has been an incentive to other societies throughout the country. You are familiar with the plan as expressed in the amendment to the constitution of the National Dental Association, introduced at the last meeting in Louisville, looking to the creation of an endowment fund whereby every member of the National Association will contribute to the maintenance of the institute. Already eighteen of the states have voluntarily and unanimously voted to endorse this plan and changed their constitutions to conform to this ruling.

We are heartily in accord with this amendment, and believe it to be an equitable financial adjustment worthy of our unanimous endorsement, and we sincerely hope that this society will instruct its delegates to the National Association to support this measure and vote for its adoption at the meeting in October next year, and provide for its adoption at this meeting, changing the constitution of this society to that effect.

With the advent of our new dental profession, moving forward under its ideals and standards, we are assuming new and larger responsibilities, not measured by our splendid increase in numbers. This responsibility of necessity falls upon the executive officers of the society. With the reorganization plan so efficiently in operation, the democratic form of government and representation, while adding many elements of great value, has increased the detail responsibility of those officers who carry over. The greatest need grows out of our increased opportunity for a better profession by improving our state organization through the establishing of an office, which in effect is that of a managing director in the form of a paid Executive Secretary, being the one officer carried over from year to year, who has the task of initiating the newly elected officers. The precedent for this is found in the National Dental Association, and some of the most effective state societies which are adopting this plan.

We, therefore, recommend that this society plan to enlarge the position and powers of the secretary, to give him these added executive powers and duties, and that a committee be appointed to study this matter and make recommendations to this society at its next meeting.

It is a matter of gratification to note the work of the various committees during the year. The membership committee has been active and efficient. Some component societies report every eligible dentist in their jurisdiction a member of the society. The "Preparedness Plan" of the chairman of the supervision of components, of having a reserve corps of essayists ready to meet immediate requirements of the various societies, has proven to be an excellent scheme well executed.

The members of the local arrangement committee have more than justified our belief in their ability to maintain the reputation of the "Dayton Way" in the splendid and complete arrangements for the conduct of this meeting. The earnest efforts of the program and clinic committees to furnish a program worthy of the high standard of this society we leave to your verdict as to whether it has been realized.

In acknowledgment with full appreciation of the generous support of the officers, committees and members who, by their loyal, unselfish devotion to the interests of this society, have made this meeting possible, the thought which should be an inspiration to each of us—so beautifully expressed by Phillip James Baily—comes again to mind:

"We live in deeds, not years;
In thoughts, not breaths;
In feelings, not in figures on a dial.
We should count time by heart-throbs;
He most lives who thinks most,
Feels the noblest, acts the best."

Aspirin

The continued use of aspirin has frequently been observed. It cannot be denied that it has a tendency to produce a feeling of well-being which leads to its repeated use. This, together with the fact that it is not used without danger, should be a caution against its indiscriminate use.

—*J. J. Russell, Ohio Public Health Journal.*

PHYSIOLOGY*

BY WM. LIGHTNER CONRAD, D.D.S., ST. LOUIS, MO.

THIS PAPER on Physiology that I have made an attempt to write, was assigned to Dr. Leo Shaekle, and I was down only for a discussion. For reasons unknown to this society, Dr. Shaekle was unable to appear before us tonight. On account of the very short time I have had to prepare this paper, I would like to ask you gentlemen not to expect anything more than a brief discussion on this subject, something that you all know and have heard many times before, as Dr. Shaekle may have had a few personal physiological theories to enlighten you upon this evening.

In beginning, I would like to quote a few definitions, not to enlighten you gentlemen especially, but as a sort of a basis for my theme.

Physiology is that science which deals with living things, with the normal vital processes of animal and vegetable organisms. Pathological physiology is that part of the science of disease which treats of disordered functions as distinguished from anatomical lesions. Oral physiology is that science which treats of the various processes or changes which take place in the organs and tissues of the oral cavity, during life and health.

These processes, however, must not be considered as by any means peculiar to the human organism, since, putting aside the proper ties which serve to distinguish man from other animals, the changes which go on in the tissues of the oral cavity of man go on in much the same way in the tissues of the oral cavity of all other animals as long as they live. These processes are called vital phenomena. And I think a deeper study of this so-called vital phenomena will help us to come to a clearer way of diagnosing and successfully treating the many dental diseases which are confronting us at the present time, namely: dental caries, erosion, pyorrhea alveolaris, and other seemingly systemic disorders, etc.

The lips are the two muscular folds which bound the mouth anteriorly. The indications of the physical characteristics of these are more general than local. They present marked differences in different constitutions, being sometimes thick, red, rosy, or pale and thin, according to the quantities of the arterial blood that circulates through their arteries. They are covered with a modified mucous membrane which begins with the mucous membrane of the mouth and changes color at the outer margin, and are made up of skin, fatty superficial facia, the orbicularis muscle, submucous tissue and the mucous membrane, having no hair follicles contained within them.

The mucous membrane lines the entire surface of the cavity of the mouth, palate, pharynx, lips and tongue, communicating freely with the external air, and when it is inflamed, the diseased condition terminates in the production of pus. It also is an organ of secretion, together with the special salivary glands, the products being known as secretions, and the process itself being known as the act of secretion, being discharged on the free mucous surface and known as the saliva.

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*Read before the St. Louis Society of Dental Science, 1916.

During the course of his life, man, in common with most other animals, is provided with two sets of teeth. The first or temporary set of infancy, are lost, to be replaced by the second or permanent set.

A tooth is generally described as possessing a crown, neck and root or roots. The crown is the portion which projects beyond the free margin of the gum, while the neck is that constricted portion of the tooth just below the crown which is embraced by the free margin of the gum, and the roots include all below this portion of the tooth.

A tooth is principally composed of a hard, superficial material called dentin, which is hollowed out into a central cavity which resembles in general shape the outline of the tooth, and is known as the pulp chamber and the root canal. The pulp of the tooth is composed of fibrous connective tissue, blood vessels, nerve tissue and a large number of cells of varying shapes; this pulp tissue contains no lymphatics. On the surface in close connection with the dentin there is a specialized layer of cells called odontoblasts, which are elongated, columnar cells, with a large nucleus at the tapering ends farthest from the dentin. The blood vessels and the nerves enter the pulp through a small opening at the apical extremity of each root, called the apical foramen.

A layer of very hard, calcareous material, known as the enamel, caps the crown and the dentin underneath; beneath the level of the gum is a layer of true bone, called the cementum, this being covered in turn by the pericementum. The enamel and cementum are very thin at the neck of the tooth where they come in contact, the cementum overlapping the enamel. The enamel becomes thicker toward the crown of the tooth, while the cementum becomes thicker toward the lower end or apex of the root. The crown on the occlusal surface is called the incisal edge in the anterior teeth and forms cusps in the posterior teeth.

The dentin closely resembles bone in its composition, chemically, while in structure it is finely channelled by a multitude of delicate tubes which, by their inner ends, communicate with the pulp cavity, and by their extremities come in contact with the under part of the enamel and cementum, and sometimes even penetrate them for a greater of lesser distance. The matrix in which these tubes lie is composed of a reticulum of fine fibers of connective tissue, modified by calcification, and where this process is complete it entirely hides this matrix by densely deposited lime salts. These tubules of the dentin contain fine prolongations from the tooth pulp or small strands of nerve fibers, which give the dentin a certain faint sensitiveness under ordinary circumstances and make root-canal work a serious proposition, and without a doubt have to do also with its nutrition, although the dentin receives some of its nutrition from the pericementum coming through the cementum. The outer portion of the dentin underlying the cementum and the enamel contains cells resembling bone corpuscles.

The enamel, which is by far the hardest portion of a tooth, is composed chemically of the same elements that enter into the composition of dentin and bone, containing a larger portion of inorganic matter and is harder than any other tissue in the body. This being composed structurally of fine hexagonal fibers being set on end, vertically, to the surface of the dentin and fitting into corresponding depressions in the same.

Like the dentinal tubules, these enamel rods (as they are sometimes called) are disposed in many and parallel curves, the fibers are thus marked by transverse lines, they being also mostly solid, but some of them may contain a very minute canal. The enamel prisms are connected together by a trail of a glossy homogenous-appearing cement substance, which is no doubt the remains of cell inclusion during formation.

The pericementum, or peridental membrane as it is sometimes known, is of such consistency that while it holds the teeth sufficiently firm for function, they are not perfectly rigid in their sockets, and an inflammation of this membrane will cause the teeth to elongate from their sockets and become abnormally loose. The gums may be inspected and palpated throughout their entire extent, and are composed of a muco-periosteum which surmounts and is attached to the alveolar processes of the jaws. This covering resembles the soft tissue of the hard palate and contains large mucous glands which are especially numerous near the necks of the teeth, and any of them may give origin to an infection. They are covered by heavy mucous membrane which is continuous with the mucous membrane of the lips, cheeks, palate and tongue by the floor of the mouth. The muco-fibrous tissue rises on the base of the crown of each tooth, forming a collar which constitutes the gingival margin, and the interdental spaces into which the gingiva extends forms the gum septum. The gums may recede, become infected, become fissured, swollen or hypertrophied, and have mucous cysts.

The alveolar processes, like other bone, are covered by periosteum from which they derive their nourishment and support; they give support to the teeth, holding them in their proper places and when the teeth are removed, the alveolar process is absorbed from lack of function. These alveolar processes may be fractured, misplaced, seats of tumors and cancer and other bone-destroying infections.

The conditions for the perception of taste are, first the presence of a sense organ, a nerve and a nerve center with special endowments; second, the excitation of the sense organ by the sapid matters, which, for this purpose, must be in a state of solution; third, a temperature of about 37 to 40 degrees C., or around that. The principal organ of the sense of taste is the tongue, but the soft palate and its arches, the uvula, tonsils and probably the upper part of the pharynx are also endowed with the sense of taste. These parts, together with the base and posterior parts of the tongue, are supplied with branches of the glosso-pharyngeal nerve, this being the principal sense nerve of taste. The anterior parts of the tongue, especially the edges and tip, are innervated by fibers from the lingual branch of the fifth nerve. The mucous membrane in the regions just mentioned possesses special epithelial structures called taste buds. The taste buds are very abundant in the side walls of the circumvallate papilla; they are also present in the fungiform papilla, in the foliate papilla and in the mucous membrane. The taste bud is located at the deeper part of the stratified epithelium, is ovoid in shape and its free end abuts on the surface or opens to the surface by a short canal; a bundle of nerve fibrils enters the base of each taste bud and forms a net about the taste cells.

The food is received into the mouth and is subjected to the action of the teeth and tongue, being at the same time mixed with the first of the digestive juices—the saliva. The salivary glands are the sublingual, parotid and submaxillary glands; the function of these glands is to secrete the saliva.

The process of secretion of the saliva is dependent upon the activity of the secreting cells, maybe by filtration and diffusion. The act of mastication is performed by the biting and grinding movements of the lower jaw against the upper. The simultaneous movements of the tongue and cheeks assist by crushing the softer portions of the food against the hard palate and gums, thus supplementing the action of the teeth and by returning the morsels of food to the action of the teeth as they are squeezed out from between them until they have been sufficiently masticated. This action of mastication is voluntary and is much assisted by the saliva which is secreted by the salivary glands in largely increased amounts during the process. The intimate incorporation of the saliva with the food is termed insalivation.

The time will come when every dentist will be doing his own saliva analysis, to see if the salivary glands and mucous cells are functionating properly.

Gentlemen, I want to thank you for the earnest attention you have paid me, and only hope this paper has been of interest and some value to you.

The British Army

A writer in the *Lancet* gives the following method of realizing what it means to increase the British army from 805,000 to 4,000,000 men: "There are 810,697 words in the Bible, and we had about that number of soldiers at the outbreak of the war. There are also 3,566,480 letters in the Bible, and we can now consider every letter as a soldier instead of every word as heretofore. Also we may consider that the first letter of every three verses is a medical man in the Royal Army Medical Corps, for there are about 10,000 medical officers now, and there are 31,173 verses in the Bible. To take a Bible and turn over its leaves and realize that every single letter is a soldier in our army produces an impressive feeling of what fighting means.

—British Dental Journal, per Australian Journal of Dentistry.

IMPORTANCE OF STANDARDIZING LECTURES AND UNIFORM METHODS OF ORAL HYGIENE CAMPAIGN*

BY THADDEUS P. HIATT, D.D.S., NEW YORK CITY, N. Y.

THE SUBJECT I am to speak upon this evening is of great importance to all of us. Today we realize more than ever before that our profession is confronted with a condition that calls for the earnest attention of all thinking men.

The medical profession believes that a large number of systemic disturbances owe their origin to dental conditions, and there is danger of this being much over-rated. While it is true that many cases of body ailments have been eradicated, cured or benefited by dental treatment, we do not as yet know to what extent this holds true in a large number of cases. I mean by this we are not yet able to tell what is the percentage of systemic disturbances that owe their origin to dental lesions. In other words, in one thousand cases of rheumatism or arthritis, what per cent. are caused by dental conditions? Nevertheless, today we know that a sufficient number of such cases do occur, and that they are cured when the dental cause is removed; and we therefore realize the great responsibility resting upon us to use every means in our power to educate the people so they will practice thorough oral prophylaxis, which we know will to a great extent prevent dental decay.

A careful estimate based upon the examination of many thousands of persons shows an average of five dental cavities in each mouth. If we multiply this by the population of the United States we will find there are five hundred million cavities needing the attention of dentists. It will take over one hundred and twenty thousand dentists more than one year, working six hours every day, to do this work. There are only forty thousand dentists in the United States. In these figures no allowance has been made for treatments, root-canal fillings, large restorations in gold or amalgam, crowns, bridges, plates, or any orthodontic work. You can therefore understand the physical impossibility of gaining any success if our efforts are confined to reparative work alone.

We must look around and find some other measure that can be adopted which will in some way enable us to cope with this situation.

The Oral Hygiene Campaign was started in this country not so much in the hope that people becoming better acquainted with the importance of our service will therefore seek the dentists, but rather to teach them the importance of mouth cleanliness and thus retard the enormous development of tooth decay. This is the ideal of the Oral Hygiene Campaign. The hope and desire of those who are active in this work is to educate the people so they will understand the importance of systematic and regular attention being given to the care of the mouth.

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*Read before the Ohio State Dental Society, December, 1916.

In carrying on this work by state and local societies, it should be realized that a uniform method of instruction in tooth brushing and the use of standardized lectures will prove of the greatest value.

We should all agree to adopt the same outline form for lectures, to teach the same method of tooth brushing, the same form of tooth-brush drill for school children. If we use different forms of lectures in different parts of the country and teach different methods of tooth brushing, we shall never gain any satisfactory results, because the methods taught and advocated in different parts of the country being different, the results must necessarily be different. It should be understood that if one method has been agreed upon, it does not follow that the future will bring no changes or improvements. It will be far wiser for all to agree to adopt a standardized form of lecture which may be already in use, and the same method of tooth brushing and tooth-brush drill, and go to work actively teaching them.

Meanwhile appoint a committee to study up the question of lectures, have them get in touch with other societies that are giving such talks, and correspond with individuals who lecture upon oral hygiene. Find out from principals and teachers, doctors and leading dentists interested in research and other dental work, what they would consider good points to be brought out, and what should not be brought out. Suggest to the National Association the formation of an Oral Hygiene Lecture Section, and have rules and regulations. At the annual meetings make such changes in the lecture forms as may seem desirable and which has been voted upon at a regular meeting of this section. The National Dental Association would then stand back of such lectures.

Another committee should be appointed to investigate most thoroughly the different methods of tooth brushing. One way in which much might be learned would be to have one class in a public school taught very carefully one method of using the brush. Another class in another school taught another method. Teach three or four methods; offer a prize to the class which follows its own method the best. Other prizes might be offered in each class to the child who did the best work. A careful examination of mouths of each class should be made and recorded before they start to learn the drill. Provide for demonstration drills to be given two or three times during the year before the investigating committee. At the end of the year have another examination made of the mouths and recorded upon new and separate charts. A comparison of these charts and a study of the changes should give us very valuable information.

In New York, the First and Second District Dental Societies have each appointed five of their members to serve upon a joint committee on oral hygiene. A number of sub-committees have been appointed, one for standardizing of lectures, one on literature, one for investigating the different methods of tooth brushing, one on charts, slides and films to be used in the lectures.

The committee as a whole has decided to teach the Fones method of tooth brushing for the coming year, and to use the tooth-brush drill as worked out by Dr. Stevenson and taught last year in the public schools.

It is my hope that your state and local societies will join with us of New York, and will accept for the time being the results of our work and adopt our lecture form, method of tooth brushing and tooth-brush drill. On our part I can assure you we do not claim that our lecture forms are the best that can be devised, or that a better method of tooth brushing may not be found, but we believe that so much good will be secured by a uniform method being used throughout the country that we ask you to co-operate with us in using these forms. As soon as improved forms of lectures and tooth brushing are found, you will find us in New York glad and willing to accept, adopt and teach the newer methods. In this way we believe more good can be accomplished as a deeper impression will be made upon the public mind when they find the same ideas and teachings are accepted and advocated by all dental societies throughout the country.

ANNUAL CLINIC MEETING OF THE CLEVELAND DENTAL SOCIETY*

Dr. Henry Barnes: Demonstration of proper technic in maintaining a clean mouth. A softened brush is used, placed at an angle of from 40 to 45° from the perpendicular, passing first over the soft tissues, then on to and between the teeth. Claims to prevent and in most cases cure spongy gums and pyorrhea.

Dr. W. A. Loope: Demonstrating vulcanite rubber for cleaning burs. Rubber points; Dunn's prophylactic rubber cones; clothespins for holding gold shell crowns while polishing; different colors of temporary stopping to indicate different treatments. Using hollow wire for gas instead of rubber tubing for small lamp on bracket table, etc.

Dr. M. B. Galvin: Novocain for blocking the nerves for operative and surgical dentistry. Point of insertion is above the apices of the roots for infiltration; bury the needle about one-eighth inch. Uses the infra-orbital more than Fisher recommends.

Dr. A. W. Haines: Demonstrating cusp-forming pliers in the construction of gold shell crowns, with special reference to securing efficient occlusion in cases of irregularities.

Dr. W. P. Smith: Sterilization of broaches by means of sterile sand and formalin solution. Also alcohol solution. Saturated solution of borax with fifteen per cent. formalin; second solution ninety-five per cent. alcohol; five minutes in formalin solution and rinse in alcohol.

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*Held at Hotel Statler, Cleveland, April 2, 1917.

Dr. J. A. Phelps. The use of regular base-plate gutta percha for temporary fillings. Base-plate gutta percha is the most sanitary thing you can use in the mouth.

Dr. George Camp: Showing the Standard set of forceps. I want to show the superiority of the straight beak, long handle and the joints, so that you don't lacerate the patient's mouth and gums; grip, and just in a general way trying to show why the Standard forceps are superior to anything on the market at the present time. Special Winter elevators for the inferior roots and broken-down teeth; Cryer elevators; the famous LaCluse elevator and the special third molar instrument.

Dr. Geo. Bishop: Recommending a flat base in preparation of all teeth and roots for bridges and for plate work.

Dr. R. G. Olson: Making retainers for orthodontic proceedings in the correction of mutilated mouths. Using small removable appliance; to provide proper occlusion as well as maintain the regained normal position of the teeth. An ingenious device for making wax in the form of sprues, etc., using an old water syringe.

Dr. W. D. Gans: Indirect method of making clasps both cast and swaged, using clasp metal. The use of terra plastica in making direct models.

Dr. W. C. Stillson: Demonstration of different methods of reducing fractures of the mandible, showing the use of orthodontic appliances and interdental wires and interdental splints.

Dr. Frank Acker: Demonstrating that a small high-frequency machine will give you a bone detail just as effectively as a high-priced machine. Resorption of the bone in the X-ray may be a mistake in diagnosis, or a misreading of the picture. You can make your lantern box very reasonably by simply having a frosted plate of glass, have box painted white on the inside and containing a couple of lamps, each having separate switch.

Dr. Varney Barnes: Demonstrating the separate steps of impression taking and cast making from the cleaning of the teeth to the finished accurate cast, which duplicates the mouth forms.

Dr. Frank L. Olds: Demonstration of Dr. H. E. S. Chayes' removable bridge attachments, showing a practical case.

Dr. Herbert Dowd: Demonstrating the Callahan method of root-canal filling, using chloroform and rosin and gutta-percha points.

Dr. E. W. Graebner: Demonstrating novocain technic and Chayes' removable bridge.

Dr. J. P. Henahan: The application of the X-rays in diagnosing dental lesions, using a Rogers coil.

Dr. W. J. Pryor: Trying to extract dollars from dentists for membership in the Preparedness League of American Dentists.

PREPAREDNESS LEAGUE OF AMERICAN DENTISTS

(Headquarters, 131 Allen street, Buffalo, N. Y.)

THE PREPARATION OF THE MOUTH OF APPLICANTS FOR ENLISTMENT

This is without doubt the most important service the Preparedness League of American Dentists can, at this time, render our government. We request all members when possible to fulfill this duty in a most conscientious manner. We are proud of the work our profession thus far has done in a most generous and unselfish spirit.

The applicant should not receive our gratuitous service until he has been rejected by the army examining officer because of defective teeth alone.

Suggestions: 1. See that the applicant is worthy and unable to pay for dental service.

2. He should be accompanied by a non-commissioned officer from the recruiting station to the dentist, bearing a letter written on war department stationery, signed by the examining officer in charge of the recruiting station. When completed, especial care should be observed to return him to the recruiting station to complete his enlistment.

3. When unaccompanied, the league suggests that the applicant sign his name on the letter furnished by the examining officer, which signature should be duplicated upon his arrival at the dentist. This will obviate the possibility of transferring the privilege to another person.

Our service has to do with the applicant before enlistment and not with the recruit who has taken the federal oath. Such cases are for the government to take care of, because it cannot accept gratuitous service. We thereby will create a greater need of an adequate corps of Army Dental Surgeons.

Procedure: 1. The committee in charge should always be members of the league. A canvass, either personal or by mail, should be made among the dentists within the territory of the recruiting station to determine the time and number of hours which each dentist will give for this purpose. All applicants may then be referred in regular order to the league members for service.

A feasible and successful plan may be followed by arranging with the recruiting officers for a dentist to visit said station for a half hour on one, two or three days each week, as conditions may require, when all dental defectives may be examined, charted and assigned to volunteer dental surgeons for treatment.

2. In some instances a room in close proximity to the recruiting station has been equipped for service, thereby obviating several features mentioned in above suggestions.

Public dental clinics, such as dental colleges, free city dispensaries, as well as private offices are, in many localities, being utilized for this purpose.

These problems must be met as indicated by the varied needs and conditions presenting themselves in different sections.

Dental Requirements: A clean mouth never produces disease. The most essential requirement is to make the mouth hygienic.

DENTAL REQUIREMENTS FOR APPLICANTS FOR ENLISTMENT TO THE ARMY

Four molars or bicuspids on one side and so opposed as to serve the purpose of mastication, will admit an applicant to the Army or Militia, provided there is absence of all disease-producing conditions, such as broken-down or abscessed teeth and roots, acute pyorrhea or infectious conditions of the mucous membrane of the mouth, etc.

Bridge work and properly-filled teeth count as sound teeth. Partial dentures may be accepted, provided the above requirements are present, but full dentures are not permitted.

DENTAL REQUIREMENTS FOR ENLISTMENT TO NAVY

Twenty sound teeth.
Four opposing incisors.
Four opposing molars.
Bridge work and properly-filled teeth count as sound teeth.
True pyorrhea is cause for rejection.
Full and partial dentures are rejected by the navy.

In regard to this work we recommend:

First: That only enough dental service be rendered to enable applicant to enlist.

Second: That fillings be limited to cements and amalgam.

Third: That no plate work be undertaken, as the enlisted men can so easily break or throw it away, thus claiming disability.

Protection for Facings

During the soldering of porcelain faced bridges and crowns where the ordinary facings are used, we find that some of the investment or the flux has fused to the labial surfaces. This frequently checks the facing, also destroys its lustre and finish. To prevent this from taking place, the porcelain should be given a couple of coats of shellac which are allowed to dry before investing in the usual manner.

—*F. W. Frahm, Pacific Dental Gazette.*

From Our Contemporaries

MODERN ROOT-CANAL TECHNIC—AS CONTRASTED WITH THE TEACHINGS OF ONE OF THE LEADING DENTAL COLLEGES IN 1906

BY DR. W. H. ELLIS, MIDNIGHT, MISS.

THE PURPOSE of this article, written wholly at my own volition without suggestion from anyone, is to describe the treatment and filling of root canals, in my own individual practice, during the past eight years, compared with the method followed for the first three years after my graduation, the methods of 1906, still being taught very generally.

Immediately after my graduation in 1906, from Vanderbilt, I began practice in the small towns in my state, going from place to place, remaining in each place only so long as I had work to do. In this manner much experience was gained in the smaller towns of the Mississippi Delta, at that time not over-burdened with dentists, where even the white people in the towns and for miles around hardly knew what the word "dentistry" signified.

At the college we had been taught, and consequently it was our practice, that when a nerve was accidentally exposed, and could be extracted by using a broach, it was good practice to fill the root at once; the theory being that, as it was a fresh wound at the apex, it would heal by "first intention." However, under all other conditions, whether the nerves were destroyed in operation or found dead upon opening up, the root must then undergo a course of treatment before it should be filled, and if there happened to be an abscess, with a fistula, said fistula must be cured and healed perfectly before the root could be filled.

Accordingly, all devitalized teeth were treated in the stereotyped manner, which consisted in first cleansing the root canals, as well as possible, and secondly, in the application of some alleged remedial agent upon cotton in the canal, and filling the cavity with cotton, made more or less water-proof with Sandarac varnish.

This canal treatment, or "remedy," was Black's 1-2-3. The application was repeated from day to day, or several times a week, according to how many appointments I cared to make with a patient (the amount of work I had to do being taken into consideration), until finally after from six to eight treatments, I filled the canal with chloro-percha, if the forceps were not resorted to before that time. And thus, for three years, was my practice conducted. Sometimes, after days of treatment, teeth that I thought "cured" would remain in good condition for a few hours only, and then assume a state of sudden and violent activity, bringing great suffering to the patient and trouble to the operator.

If the profession will try to form an idea of the conditions with which I had to contend—the people utterly ignorant of oral hygiene, tooth brushes unobtainable at the few stores, teeth entirely neglected until pain forced the owner of an offending tooth to visit an M. D. and pay him a dollar to "pull" it, if it could be done by using one out of an assortment of three or four rusty forceps, the first remark of patient to dentist being invariably, "How much will it cost me, doctor?"—pulps dead, or nearly so, so badly decayed that one or two scoops with an excavator would expose them; if you can form in your mind a picture of such conditions, where canal treatment was the rule instead of the exception, you will appreciate the joy of my heart in anticipating something modern in the line of treatment for such cases.

Probably forty per cent. of the members of the profession will be unable to appreciate my trials, for they are domiciled in the cities and larger towns of 2,000 to 8,000 inhabitants, with good schools for the little tots, where they are taught oral hygiene from their teachers, the use of the tooth brush, and to notice the attractive displays of dental articles in the drug stores; drawing their clientele from such as these. I say again, this forty per cent. cannot appreciate the awful conditions in which I found myself, because preventive treatment in early childhood, constant attention to oral hygiene throughout life, with easy access to the dentist at all times, prevent such cases coming into their practice; but the other sixty per cent. of the profession, the conservative men, in the small villages of 500 to 800 inhabitants, drawing their practice mainly from the country, composed of the class and condition of people that I have described—this greater percentage of my brother dentists will say Amen! They know.

Following these three years of nightmare came eight years of modern practice; comfort to patient, short time of both patient and operator consumed, and last, but by no means least, ninety per cent. of devitalized teeth saved.

In the fall of 1909 I returned to Nashville, and was associated with a very prominent dentist of that city, at that time Dean of the dental college, University of Tennessee, as assistant. After a few days with him I had occasion to see him open up and treat a tooth, the pulp of which had died under a very large gold inlay, an upper first molar. The patient had suffered several days until, when he presented himself for treatment, the tooth was very sore, elongated and loose, so much so that the operation of grinding out the inlay was very painful. Finally, after about three-quarters of an hour of pain, the pulp chamber was reached, and the pus boiled up. After thorough drainage, without even attempting to enter the canals, the operator mixed a very thin paste of a material marked on the box "Oxpara," a material that I never had seen or heard of until that day, sealed a quantity of the paste in the pulp chamber, without pressure, with cement so mixed as to drip in—and dismissed the patient for two days! This was sometime in the afternoon, and remembering my "ancient treatment," I remarked to him:

"It is fortunate for that poor fellow that you and I are to return tonight to finish up some laboratory work for early morning, for he is sure to be here, or possibly call you at your home."

He laughed and remarked: "That fellow will be asleep before you and I get back to the office."

He then told me something about the material that he had used; how it would act when sealed in the pulp chamber; how formaldehyde gas would permeate the tubuli of the tooth, through dentin and cementum and beyond, through the apex of the root of the tooth, freeing the protoplasm of every pathogenic germ, sealing its enclosed nuclei forever, positively preventing proliferation.

My answer was, "Yes, sir; very fine indeed; so beautiful! But give that gas and pus sufficient time to accumulate in that absolutely sealed tooth, and we will see what we will see!"

My first remark on entering the office the next morning was: "Did that abscess patient call you last night?"

His answer was: "No, I have heard nothing from him."

"Strange," I replied.

"No, not at all strange. Right at this moment that patient could stand to have a gold filling malletted into that cavity."

Just the same, away down in my heart I thought that some dental-parlor man had extracted that tooth some hours since, those men being easiest to reach at night.

Next afternoon patient returned, smoking a cigar and in fine spirits. Upon being questioned, he stated that the tooth had not hurt for a single moment, and was then free from soreness and felt perfectly normal.

Rubber dam and clamp applied, cement removed, Oxpara cleared away and canals entered thoroughly with broach and cleansed. No odor except that of formaldehyde. Oxpara mixed to a little thicker paste this time, canals pumped full of the paste with a thread of cotton on a small broach, a small quantity left in pulp chamber, a cement base placed over this, when hard flattened, and cavity retouched for another gold inlay.

I remained with the doctor thirteen months, saw many cases treated, treated a number myself, and I do not remember of one single extraction on account of abscessed conditions.

I have used the solidified formaldehyde quite extensively, with fine success, attaining the same results as with Oxpara, but prefer Oxpara, because it is easier to handle, yields any desired thickness of paste, increasing or decreasing the quantity and strength of the medicines, and, in very severe cases, I have found the liquid very helpful. When my treatment is finished, Oxpara gives me a root-canal filling, in conjunction with the last treatment when the filling is placed, that so far I have found nothing to equal.

Oxpara neither contracts nor expands. Any one who likes may test this very easily by filling a small vial and watching its action. When set and solidified, Oxpara is not affected by the fluids of the mouth. It will not dissolve out. This I have tested repeatedly. Again, I have had occasion to enter a bicuspid root canal two and one-half years after treating, for the purpose of putting on a Richmond crown. The odor of Oxpara was still distinctly perceptible—and there was *no other* odor. I did not disturb the filling at the apex; the tooth was in fine condition.

If it ever is necessary to remove an Oxpara filling, a few drops of the liquid on the paste in the pulp chamber will enable the operator to pick the filling out with a broach.

The formula under which Oxpara is made is such as to remove from it the stigma of being a "Patent Nostrum." Formaldehyde, thymol, alum and creosote are all well known to all of us.

While the directions are plain and simple, there are a few points that should be impressed upon the mind of the operator:

1: Always apply the dam, or keep dry by some other means.

2: Do not try to enter root canals at first sitting in any manner. Use your excavators, without pressure, in removing decomposed tissue and decayed structure. Just place your treatment in the cleansed pulp chamber and seal it in with a soft mix of cement, so as to avoid pressure.

3: Apply the first treatment very thin, to allow gas to be given off. Do not clog up by having the mixture too thick.

4: At second sitting, cleanse canals as thoroughly as possible, but do not thrust a broach into them as you would in placing a piece of cohesive gold. Use small broach, with a gentle, twisting motion, in and out, passing it from side to side so as to contact all of the walls. If there is no odor perceptible except that of the medicine, you are safe in filling at this stage. If there is odor, place another treatment, this time inserting shreds of cotton covered with the paste, and turning them around to cover every part of the canal wall. Seldom have I had to use more than two treatments. The last and final filling of the canals is also a treatment, although the mix should be quite heavy and well spatulated as one would in mixing cement.

It may be necessary to enlarge some of the canals for thorough filling. I often do, and so does every other dentist who tries to do his duty. But, whether you do this with reamers or with a solution of H_2SO_4, you can work freely, because you know that you have a sterile field for your operation, from pulp chamber to apex, because the tissues therein and surrounding have been permeated with the gases thrown off by your treatment.

In writing this article I realize that a large percentage of the dental profession have long since stopped trying to cleanse and sterilize root canals, and among them some of our most prominent men in the various associations; but, while I do not believe all that I read about arthritis, rheumatism, etc., being caused by infection from these canals, a glance at some of them that have been passed upon as O. K., and pretty gold crowns, inlays, etc., placed upon and in them, would be sufficient to convince anyone that it might well be true. The condition under some of those beautiful restorations might well cause any conscientious man to wonder.

All kinds of statements have been and are being made that all formalin preparations are dangerous antiseptics, that they destroy living cells, cause the parts treated to be more liable to future infection, cause absorption, lessen the density of the alveolus, etc., "*too numerous to mention*," as they say in the sale bills. These things I do not believe. No drug is dangerous to life as a whole, nor to particular tissues, when used with *discretion*, as all such remedies and drugs should be used. On the other hand, one can, by improper use, and especially by too frequent use, get bad results from any drug or remedy, no matter how harmless it may be when correctly applied. One can produce bad results by the use of iodin, and I have seen gum tissue actually eaten away as the effect of too frequent and too prolonged use. Judgment is what we need.

Of course, situated as I am, I have not access to radiography as a guide; and I wish to state here that I believe that at least sixty per cent. of the profession are in my situation—have not the "advantage" of the X-ray. And I also believe that if they could or would equip themselves for that work, not more than ten per cent. ever would become proficient; but by attempting such work, many deformed jaws would result, not to mention literally millions of teeth that would be lost, for most of their readings would be incorrect. (The reader is referred to an article by Dr. Charles H. Voelker on this subject, printed in the February number of *The Dental Cosmos.—Editor.*)

I am not decrying radiography as a means to a good end in those very unfavorable cases—pernicious alveolar abscess, blind and discharging; tubercular cryptogamic infections of the peridental membrane, and pericemental abscess in which necrosis of the walls has occurred; but I am contending for a middle ground, from the point of view of a conservative dentist, which I believe that sixty per cent. of the dentists of today are, where teeth may be treated and conserved in a rational manner, within the skill of all of us.

In our literature just at this time, nearly every statement made by one writer is flatly contradicted by others. Any of the dental journals of the past few months will bear me out in this. One writer does not believe that placing a gutta-percha point through the apical end of a root will cause trouble, gives pictures to prove his contention; the next one takes just the opposite side, gives pictures showing points through the end, crown-pins, etc., causing every known kind of trouble. One refers to "those inoperable canals" as dangerous culture-tubes, while another fills them to perfection; and so on, and on, and on. I could write pages of these so-called "findings" and their causes.

Brothers of the conservative profession, what are we to believe and how are we to proceed? So far as I am concerned, with ninety per cent. of devitalized teeth presenting in ordinary abscessed conditions, of the different varieties, which is the case in any man's practice, I shall continue to do as I have been doing during the past eight years; sterilize, cleanse canals, using best method for the given case, enlarge by the best method for the particular case, and fill the canals to the best of my ability, with non-contracting, non-expanding Oxpara, with a good cement base covering same in the pulp chamber. That is precisely what I shall do.

As for the other ten per cent. of those very unfavorable cases, presenting conditions such as I have mentioned elsewhere in this article, I shall use my White and Ash forceps; for I sincerely believe that, from a surgical point of view, any tooth being the direct cause of the troubles that we read about, should be removed from the alveolar socket; for any attempt at root amputation, heroic surgical cutting of surrounding tissues, and excision of one-half to two-thirds of the total length of the root, will leave in the mouth a tooth that can be compared only with some of the poor, maimed soldiers with which the world today is full, so far as any sort of service is concerned.

There are some cases of root amputation, when only a very small piece is removed, to gain or retain a tooth for a pier for some artificial appliance when there is no other recourse, and moderate curettment in these cases, that fall under the head of conservative dentistry, of the conservative-surgical type; but the heroic practices that some would have us believe are common, if daily literature tells the truth, carry the matter entirely too far to receive the endorsement of any conservative man, much less any idea of imitation.

General surgeons amputate and remove diseased, offending organs from the body, and why? Ponder this question, you heroic advocates! and come down to the earth long enough to reflect and see if there is not a surgical limit and a happy medium.—*Dental Digest.*

The Medicated Dentifrice

Under no circumstances should the dental profession acquiesce in the general use of highly medicated tooth cleansing preparations. There is, doubtless, a place for the medicated dentifrice in the treatment of diseased conditions of the soft tissues of the mouth or abnormal conditions of the oral fluids. A medicated dentifrice, however, should be used only upon recommendation of a dentist as part of the prescribed treatment in specific cases.

—*Editorial, Oral Health.*

EDITORIAL

"BUSINESS AS USUAL"

Every day some experience brings more clearly home to each of us the fact that this great, peace-loving, industrial and most intensely industrious nation is at war—is passing through conditions never before met in its one hundred and forty years of progressive experience. Every day these conditions become more and more unusual, more trying. Surely "these are the times that try men's souls," and they are times that try also the soul of the Nation, that shall determine whether or not a "government of the people, by the people and for the people" is fit to survive, or must perish from the earth, to be succeeded by retrogression to that form under which citizens cease to live as full partners in the life of the nation, and become mere chattel-serfs to be exploited at the whim and the will of the blind and selfish force of the Mailed Fist—a form which we, in common with all the other free peoples of the earth, had come to regard as outgrown and outworn, fit only for the ash-heap and the garbage-can.

The one word that describes completely the spirit that must animate the life of every citizen of a free country, if that country is to survive free and untrammelled, is "Co-operation;" and that co-operation must be voluntarily and freely rendered, must have behind it the one single motive, "the greatest good to the greatest number."

We are at war; we are now a tremendous factor in the greatest war that the world ever has seen within the scope of written history, and every day brings with it the conviction that we are to become a still greater factor, if the war is to be won for liberty, for the freedom of the individual, for the unimpeded evolution of the human race.

Already the American people have contributed unrealizable sums of money, and these sums must, in all probability, be multiplied many times before the spectre of Force is laid once and for all. In addition we also must contribute such numbers of the best of our men that every industry in our land can but find itself faced by the necessity to rearrange its organization, redistribute its personnel, in order that "Business," that mysterious something upon which the raising of enormous loans to our allies and the sustenance of our own men in the field so directly depends, may "go on as usual."

For, whether we all recognize it or not, the very core of that power with which America is to win the war if it be won, is found not in political life, not in the life of our great colleges and universities, nor in any other of the multiple activities of a great nation, but in the BUSINESS life of that nation.

Business MUST "go on as usual." Nothing else, nothing different, is at all possible. And business must go on "as usual" under very unusual circumstances and conditions. There must be not the slightest hint of the demoralization of our industrial forces. Results must be not lessened—they must be very largely increased. During times of peace each man is, theoretically at least, self-sustaining; more than this, each man may be expected to support a number of non-producers; in times of war those actively engaged in the ranks are not only no longer producers, they have become destroyers, wasters of the accumulated energy of the nation behind them. Of course, this temporary waste is necessary in order that the nation may live, and nobody is complaining about it; but, necessary or not, the fact of waste remains. It then becomes necessary for those who remain among the producers to see to it that production is not lessened but is very materially increased, because not only has the number of producers been reduced and the number of users increased, but the same number of non-producers remains to be sustained.

The spirit of co-operation must be aroused to a greater extent than ever before; each must do his best to keep production up to its full quota, and also do his best to see that enormously increased costs of production are held at the lowest possible point.

All of this means only a multiple of little things that each must do. Business is being taxed heavily, and these taxes are certain to be increased. Therefore, each of us must determine that, so far as he personally is concerned, the burden resting upon the Atlas-shoulders of Business shall not be increased.

Buying should be done wisely, but not niggardly; all wants should be supplied "as usual." The expense of conducting business should be largely reduced, among many other items by the prompt paying of bills WHEN THEY ARE DUE. Delay and negligence in the payment of bills always have added a burden to business that it no longer should be expected to sustain. It is carrying just about its limit all the time. There never has been and never can be a just and adequate reason why the collection of amounts due for purchases should make up one of the most serious items in the cost of doing business. Just or not, reasonable or not, that burden must now be eased from the back of Business, or the back may break; and if the back should break, the world will see enacted such a tragedy of ruin, bankruptcy, disorganization and chaos as never was dreamed of by the noisiest Cassandra that ever has wandered about, crying her prophesies of evil and desolation.

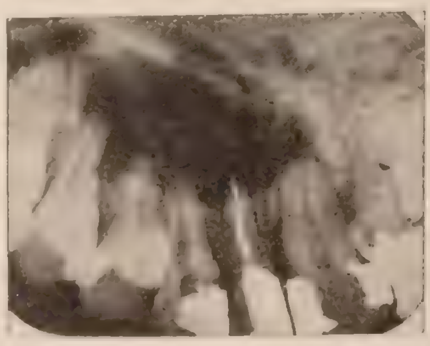
Individual purchases are comparatively very small; but the aggregate is huge; makes up, in fact, the enormous volume of American business that daily astonishes the world. If each of us will do his little part—simply, for one instance, to pay bills when due, without making necessary a single penny of added expense for collection—the wheels will continue to go round, the mill will continue to grind, and "Business as usual" will enable this country to meet to the full and without exhaustion the enormous obligations she assumed when throwing into the scales the full weight of her power against the common enemy of mankind. —G. E. H.

ORAL SURGERY
CASE REPORTS

CONDUCTED BY HUGH W. MACMILLAN, D.D.S., CINCINNATI, OHIO
THIS DEPARTMENT AIMS TO REPORT INTERESTING ORAL SURGERY CASES IN BRIEF FORM, ILLUSTRATED BY RADIOGRAPHS AND PHOTOGRAPHS WHERE POSSIBLE. ARTICLES FOR THIS DEPARTMENT MUST NOT BE MORE THAN 500 WORDS IN LENGTH. SEND CONTRIBUTIONS TO DR. HUGH W. MACMILLAN, UNION CENTRAL BUILDING, CINCINNATI, OHIO.

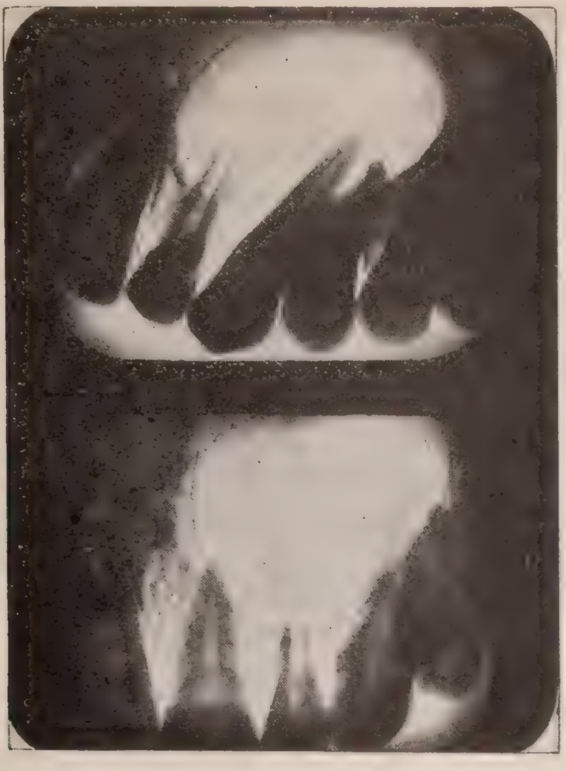
THE PATH OF DISCHARGE of alveolar abscesses depends as a rule upon the anatomical environment of the apex or apices of the teeth. For example, abscesses of the upper central incisors, cuspids and biscupids usually discharge labially as the labial process covering the roots is thinner than that on the lingual side. An abscess on the lingual root of an upper first molar usually discharges on the palate. The apex of the upper second incisor is midway between the labial and lingual plates and an abscess on this tooth frequently destroys a large area of the cancellous structure between the two plates. Frequently and usually the abscess gains egress on the lingual side to discharge sometimes as far back as the soft palate. Enormous cysts, occupying the whole area between the labial and lingual plates and part of the antrum, causing the face to bulge out, are not uncommon results of this retention of fluid, due to lack of drainage. Consequently, it is always wise when treating a devital upper lateral to radiograph the part and find out if there is bone destruction at its apex, as these cysts form painlessly and there are few subjective symptoms. In the treatment of these cases, which is purely surgical, the main thing to be considered is drainage. It is the author's practice to extract the offending tooth and to extract as many others as will interfere with the healing. The walls of the cyst are cut back to normal bone and thoroughly curetted. The wound is left open and packed. It is remarkable how rapidly these enormous wounds will fill in. The contour of the face is readily restored by properly made artificial restoration.

Illustrative cases are as follows:

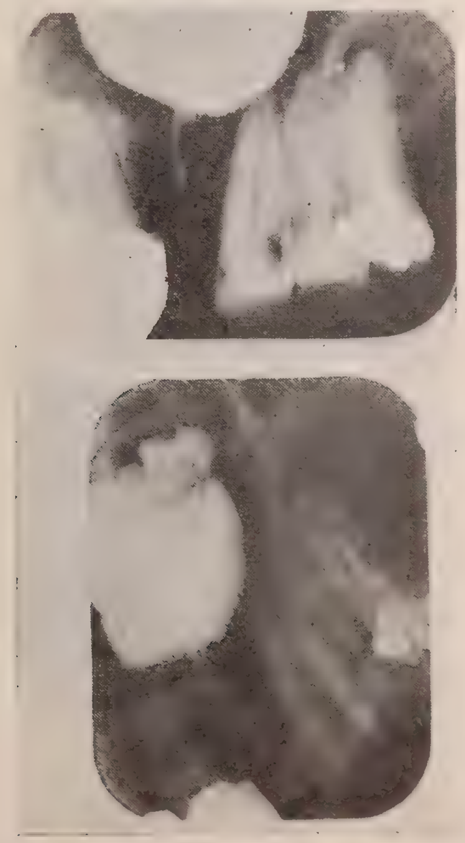


Case I—Fig. 1

Case 1, Fig. 1: Miss M. F., age 22, referred by Dr. H. Saslavsky, had been advised to have the upper jaw, which was swollen, radiographed and treated. She refused, and went without treatment for a year. Finally the face swelled so badly she had the radiographs made and teeth extracted. The swelling still persisted. When she presented to me the teeth on the upper right side had been extracted back to the first molar and the part was extended like an egg. The cyst was opened and drained. The following week the case was operated under ether and the area shown in the radio-



Case II—Fig. 2

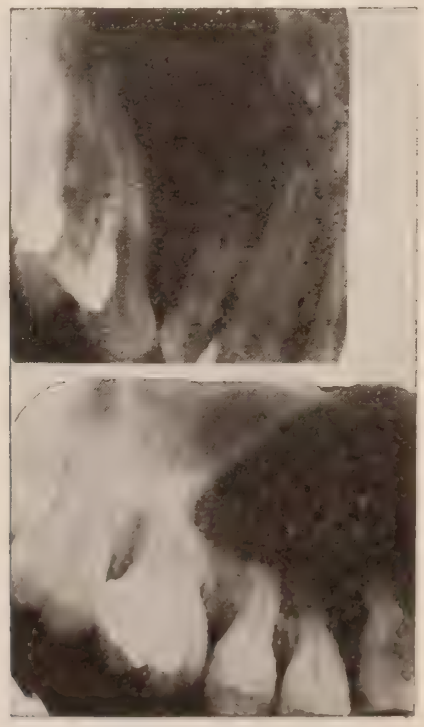


Case III—Fig. 3

graph above the teeth was thoroughly curetted and packed. The patient now wears an appliance which restores the contour and function of the jaw. This case illustrates the necessity for thorough curettment and drainage following extraction of infected teeth and particularly following the extraction of upper second incisors.

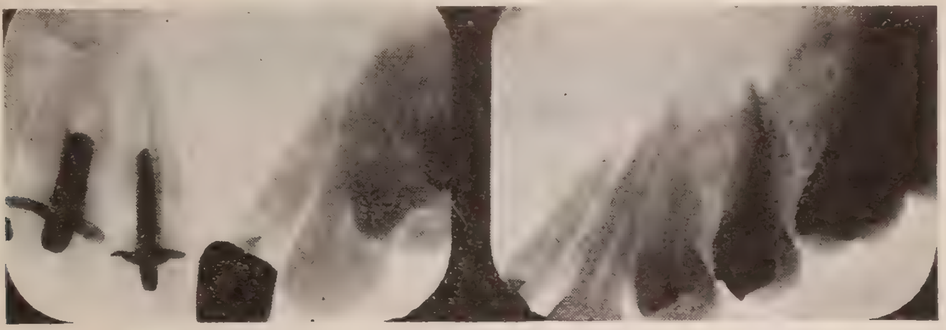
Case II, Fig. 2: Master S., age 16, referred by Dr. C. W. Cragg, gave a history of a swollen jaw for two years. The swelling would be lanced periodically by his local physician. Examination revealed a devital upper second incisor. The X-ray confirmed the diagnosis and also showed an enormous destruction of bone. Under a general anesthetic the five teeth anterior to the first molar were extracted and the cyst curetted. The part was satisfactorily restored by a prosthetic appliance. In this case the only devital tooth was the upper second incisor

Case III, Fig. 3: Mr. T. S., age 68, referred by Dr. A. W. Corrill, had a devital upper second incisor which would not respond to treatment. The tooth had been extracted and the socket continued to drain a straw-colored fluid. A probe revealed a large cavity in the bone. Bismuth paste was injected to outline the cavity for the X-ray. The radiographs revealed a large destruction of bone in the anterior part of the jaw. Owing to the advanced age of the patient a radical operation was not performed, but the labial plate was removed, giving the patient an opportunity to keep the cavity clean with a syringe.



Case IV—Fig. 4

Case IV, Fig. 4: Miss H. H., age 17, referred by Dr. J. P. Becker, gave a history of a lump being under her lip for several months. The upper right central incisor was devitalized and the root canal had been filled, but the filling had been removed to give drainage. Radiographs showed a large alveolar cyst extending from the median line to and including a part of the antrum. Under ether the teeth anterior to the second molar were extracted on the right side and the walls of the cyst cut back to normal bone. Removal of the posterior wall of the cyst resulted in opening the antrum. This is the only one of the cases reported where the antrum was opened. The patient now wears a very satisfactory appliance effectually closing the mouth from the nasal cavity.



Case V—Fig. 5

Case V, Fig. 5: Miss H. W., age 20, referred by Dr. C. W. Cragg, had been advised to have her jaw treated for over a year. Finally she had radiographs made which revealed the typical alveolar cyst arising from the upper second incisor, shown in *Fig. 5.* The operation described before was performed under ether. The antrum was not involved. The cavity filled in remarkably quickly and the patient is very comfortable with a prosthetic restoration.

(Cases reported by Dr. Hugh W. MacMillan.)

A Public Patriotic Meeting

A public patriotic meeting of the Cincinnati Unit of the Preparedness League of American Dentists was held on Monday, May 14th, at the Gibson House. The spacious grand assembly hall was beautifully decorated with flags of all the allied countries. A band concert of an hour's duration began at 7:15. Many patriotic selections were rendered, adding to the spirit of the occasion. The chairman, Dr. C. W. Cragg, introduced the following speakers: Hon. George Puchta, Mayor of Cincinnati; Capt. Royal Mattice, Adjutant 1st Reg. O. V. I.; Mr. I. G. Stewart, of the Law Department, University of Cincinnati; Mrs. Guy Mallou, president of the Women's City Clubs; Col. F. W. Galbraith, 1st Reg. O. V. I.

A pledge and salute to the flag, songs and recitations were rendered by children from the Evanston school, all of which were very effective. The meeting was closed with singing of "The Star Spangled Banner," in which the audience of over eight hundred heartily participated, while Old Glory was fluttering in the spotlight on the stage. Dr. H. Germann was chairman of the program committee. J. A. Stuntebeck, *Secy.*

NATIONAL DENTAL ASSOCIATION ANNOUNCEMENTS

PARTIAL PROGRAM

Up to date the following reports have been received from the various Section Chairmen, Committeemen, etc.:

Section 1: Chairman, Dr. E. D. Coolidge, 59 East Madison street, Chicago, Ill.

"Some Neglected Operative Pre-requisites," by Dr. Fred E. Hart, of San Francisco.

"Porcelain Inlays" (exact title not yet chosen), by Dr. W. L. Fickes, Pittsburgh, Pa.

"Interpretation of Radiographs," by Dr. Howard R. Raper, of Indianapolis, Ind.

"Present Tendencies in Operative Dentistry," by Dr. J. M. Walls, of St. Paul, Minn.

Also an important paper dealing with the subject of dental education. Essayist not selected as yet.

Section 2: Chairman, Dr. F. B. Moorehead, People's Gas Building, Chicago, Ill.

Dr. Virgil Loeb of this committee reports that he has thus far accepted two essayists: Dr. Elmer S. Best, of Minneapolis, on some phase of root-canal filling, and Dr. Howard R. Raper, of Indianapolis, on "Misinterpretation of Radiographs."

Section 3: Chairman, Dr. L. E. Custer, 28 North Ludlow street, Dayton, Ohio.

"Ionization, With Special Reference to Ionic Chemistry," by Dr. Geo. T. Fette, Cincinnati, Ohio.

"The Chemical Action of Soil Bacteria on Calcium Phosphates, With the Chemical Analysis of the Human Teeth," by Dr. J. E. Hinkins, of Chicago, Ill.

"Why Measurements of the Mandible, Tracings of the Condyles, the Construction of Hypothetical Triangles, and the Use of the Face-Bow are all Non-Essential in the Construction of Dentures Possessing the Highest Degree of Efficiency," by Dr. D. D. Campbell, of Kansas City, Mo.

Paper, subject to be announced later, by Dr. Calvin S. Case, of Chicago, Illinois.

Also two other papers, titles of which will be reported later.

State Society Officers' Section: Chairman, Dr. John C. Forsyth, 430 East State street, Trenton, N. J.

First Session: "Some Phases of Post-Graduate Work," by Dr. B. L. Shobe, Tulsa, Okla. "Securing Some Satisfactory Legislation," by Dr. Alexander H. Reynolds, Philadelphia, Pa.

The Second Session will be devoted to six or seven short papers of five to ten minutes each by men of different state societies, telling of some outstanding feature of their state society's work that is thought to be of the greatest importance, or, if the essayist prefers, he may present the weak part of the work and ask for suggestions to help them out. These papers are to be followed by a general discussion which we hope will bring out some very valuable points. The names of the essayists for this session have not as yet been secured.

Committee on Anesthetics: The secretary of this committee, Dr. Chalmers J. Lyons, of Ann Arbor, Mich., reports as follows:

"The Teaching of Conductive Anesthesia," by Dr. Theodore Blum, of New York City.

"After-Pain in Local and General Anesthesia," by Dr. A. E. Hertzler, of Kansas City, Mo.

"The Toxicity of Local Anesthetics," by Dr. Geo. B. Roth, of Washington, D. C.

Committee on Entertainment: At a recent meeting of this committee a ladies' auxiliary was organized, of which Mrs. Dr. M. L. Rhein was made the chief officer, and Mrs. Dr. Henry W. Gillett, 140 West 57th street, New York City, secretary. It would greatly facilitate the endeavors of the ladies' auxiliary to add as much as possible to the pleasures and comforts of the visiting ladies, if those who intend to come to New York would notify Mrs. Gillett, stating if possible the hotel at which they will be registered.

R. OTTOLENGUI,
Chairman Publicity Committee.

Rhode Island Board of Registration in Dentistry

The Rhode Island Board of Dental Examiners will hold its next examinations on July 5, 6, 7, 1917, in the State House in Providence. For further information, address,

ERNEST A. CHARBONNEL, *Secy.*
139 Mathewson street, Providence, R. I.

Borax in Soldering

If it is necessary to add borax while soldering, it must be dry; and a good way of doing it is by means of a German silver wire having a handle, and tipped with a small piece of pointed 14-gauge B. & S. platinum wire. This, when heated red hot, will lift and place a small particle of broken dry lump borax where desired.—*T. J. McLernon, Ash's Journal.*

SUGGESTIONS

Conducted by F. R. Chapman, M.S., D.D.S., Comumbus, Ohio

(To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Bldg., Columbus Ohio.)

Joints in Gum Sections

In filling in the joints in gum sections to prevent the rubber forcing its way through, I find that pink calxine mixed very thin acts better than any other cement; the color is harmonious and if mixed to almost a watery consistency, it will work into close joints very nicely, and sets very quickly in the warm flask. I generally apply some to the labial surfaces of the joints also before flasking.—*R. S. Boys, Commonwealth Dental Review.*

Crown or Bridge Facing

A very good crown or bridge facing is made from the ordinary rubber tooth. Select a rather thick tooth, cut off the pins and flatten the back; also flatten the mesial and distal sides by grinding slightly. Then cut a groove running approximately from the middle of the mesial cervical line to the mesial contact point or a little anterior to it; also the middle of the distal cervical line to the distal contact point or just anterior to it. These grooves should be just deep enough to give sufficient strength to the backing which is made by casting from a wax model made over the lingual side of facing and into these grooves. The facing forms a simple dovetail in the backing, making a very strong combination. The incisal edge is free of metal, giving the translucent effect so much desired, and the metal extensions on the mesial and distal surfaces are hardly discernible, or at most have the appearance of small fillings.—*Frederick W. Stephan, Dental Review.*

Double Vulcanization

By this is meant the vulcanization of the base or sub-structure, this to be used in the subsequent steps of bite taking, trial plates, etc., and the superstructure or teeth added by means of a second vulcanization.

Its advantages may be summed up as follows:

1. Provides rigid and well-fitting bases for subsequent steps of bite taking, etc.

2. Provides a means of detecting any possible error in impression or retention before finishing the case.

3. Greatly facilitates developing esthetic features of denture.

4. Renders simple and efficient the process of automatic grinding of the vulcanized dentures.—*E. B. Owen, Dental Review.*

Substitute for Dental Rubber

The lack of rubber in Germany, a matter of common knowledge, may, perhaps, have caused some to wonder how dentists have managed to make dentures. In the *Monatsschrift fur Zahnheilkunde* some papers have recently appeared discussing the use of various substitutes. Aluminum and magnalium are mentioned as suitable materials, but apart from the questions of cost and time is the fact that the army authorities have marked down these substances for more important purposes. Reclaimed rubber is difficult to get, but some sold as "walrus" brand, "war quality," is advertised. The substitute advocated is "Zellon." This is a material sold in cakes, which presses, when warm, into shape and retains it when cold. The denture is set up and flasked in the ordinary way, the wax boiled out and the flask made warm. A cake of "Zellon" is then pressed in; when cold the case is taken out and polished, care being taken not to make the plate hot during polishing. Pin teeth are used, diatoric teeth not being gripped by this material. It is hoped such dentures may serve till the end of the war, at least for the soldiers who stand the most in need of them. Platinum also is sought. Zahnarzt Max Friedland (Altona), makes a proposal worth taking to heart, in the *Zahnarztliche Wochenschrift* to collect platinum. He is quite willing to give further details to those colleagues willing to help the good cause. Artificial rubber, that sheet-anchor of the "bear" in the days of the rubber boom, does not seem to have materialized.—*British Dental Journal, per Australian Journal of Dentistry.*

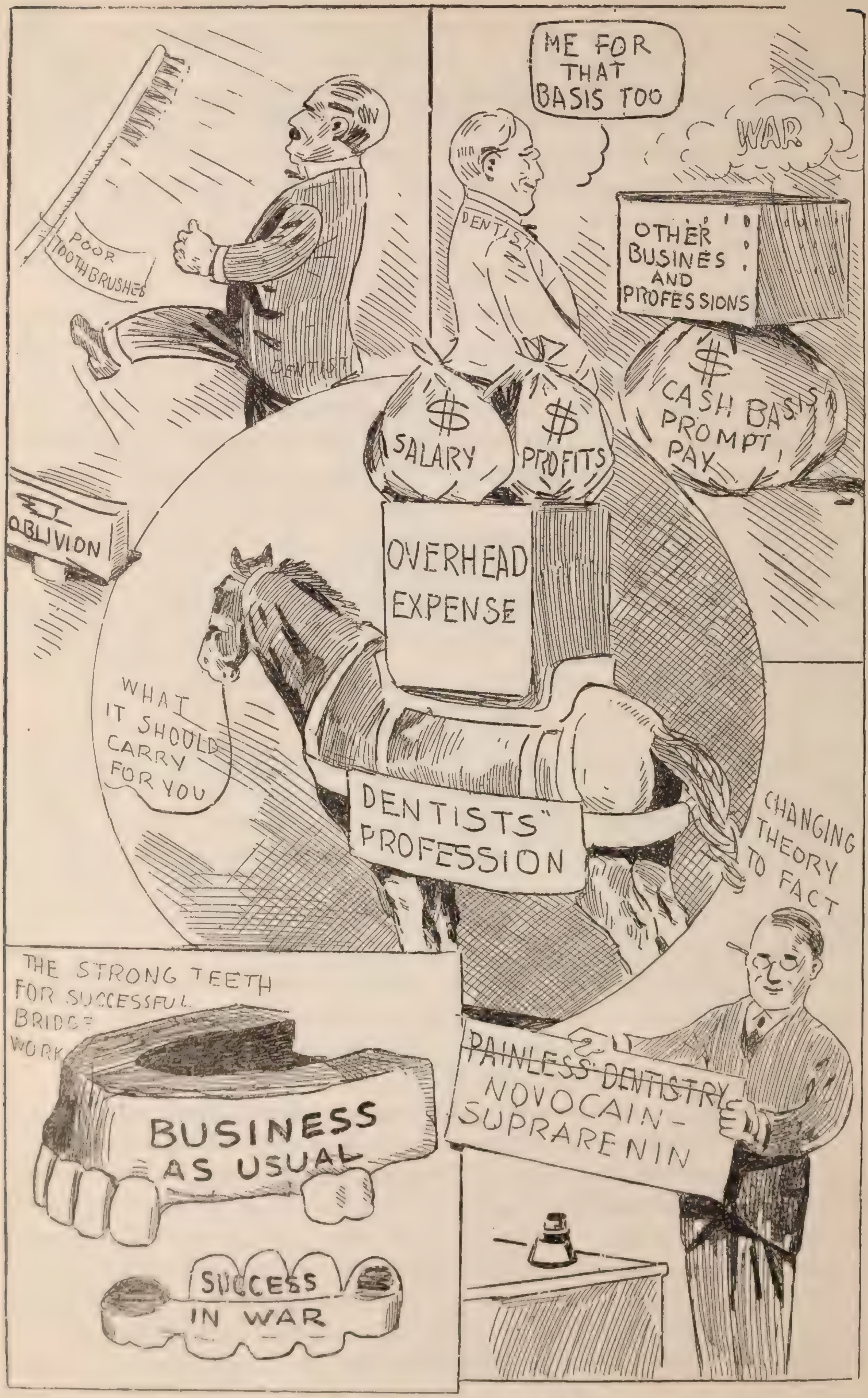
Root Canals

The chip blower heated over the alcohol lamp generates formaldehyde gas as the air is drawn in; this expelled into the roots of teeth is why drying the root canals has been so effective. Please bear in mind that the electric hot air is not as efficacious, as it is simply hot air that comes from an electric syringe. You can easily prove it for yourself by the acid sulphuric and resorcin test. The slightest trace of formalin will turn it purple. This a a chip blower will do; an electric will not. Stick to your chip blower—and use a fresh one now and then, and be careful of water condensing in same. Formaldehyde gas is a wonderful antiseptic.—*Homer Almon, Dental Review.*

Matrix for M. O. D. Cavity

The mesial cavity is enclosed by means of the ordinary ivory matrix and holder. To enclose the distal cavity take a piece of banding material used in orthodontia, cut so it will be wide enough to reach from gingival to occlusal and long enough to encircle about two-thirds of the tooth. Bend this matrix with the fingers and round-nose pliers until it forms two-thirds of a circle. This matrix is placed over the distal cavity; then when the ivory matrix is placed over the mesial cavity the distal matrix is drawn tight against the tooth. Now you are ready to pack your amalgam or wax for inlay.—*C. E. Fellman, Western Dental Journal.*

"Business as Usual."



Read editorial, page 546.

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXVII August, 1917 No. 8

We Publish the Proceedings of the Following Societies:

The Ohio State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
Iowa State Dental Society
Texas State Dental Society
Tennessee State Dental Society
Section on Stomatology—American Medical Association
Interstate Association of Anesthetists
and Several Local Dental Societies

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L. P. Bethel, M.D., D.D.S., Editor-in-Chief

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REGULAR CONTRIBUTIONS

THE UPPER THIRD MOLAR AND ITS RELATIONS*

BY PAUL CASSIDY, A.B., D.D.S., CINCINNATI, O.

NO SERIOUS CONSIDERATION of dentistry can be made without the recognition of the fact that the two highest offices, or prerogatives at least, of the modern dentist, are destruction and prevention. These two are linked finally in one, prevention. For it is not only for the alleviation of existing troubles that destruction of tissues and organs becomes for us not a privilege but a mandate; far greater, indeed, is the necessity of destruction for the prevention of numerous and more serious evils the future holds in store.

Nowhere within those limits that have been set down for dentistry does prevention play so important a part in the prevention of countless consequent ills as in the case of the upper third molar.

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*Read before the Rehwinkel (Ohio) Dental Society and Northern Ohio Dental Association, 1917.

I come to you, therefore, tonight, gentlemen, with an earnest plea for the destruction of the upper third molar at the earliest possible moment. I will show you why the upper third molar is not only an unclean and an uncomfortable and discomforting member of the dental collection, interfering in large measure with the proper masticatory movements of the lower jaw, but in addition the reasons for its very considerable influence upon the eruption and final placement of the lower third molar.

Obvious facts, met with daily in familiar forms, become less impressive to us as the years roll on. It is only when we learn, at times with dismay, that these same facts, so evident as such to ourselves, are not in any sense obvious to the mass of our fellows, that we give pause and ponder and, finally, prepare our message to make them as plain as may be to all who will listen or read.

The truth of the matter is that the great body of dentists has never considered, as the matter deserves consideration, the influence the upper third molar bears upon the surrounding tissues. This assertion is made with full consciousness of its seeming egotism, and I only now make it because in discussions with dentists, many of them extracting specialists, I have learned that, as a rule, we have no clear knowledge whatsoever upon the subject.

The simplicity of the removal of this derelict of a past age leaves no excuse whatever for its being permitted to remain an integral part of the human organism, exerting as it does in many ways a baneful influence.

The story of an upper third molar is an interesting one, no matter with what condemnation we voice our cry for its rapid elimination. We are told its appearance is usually made at about the eighteenth year. It occurs, ordinarily, at an earlier period in the female than in the male, some claiming that this difference is as great as two years. As you know, its position in the mouth is in the most highly vascular bone contained in either of the maxillæ. I mention this in passing to indicate the ease with which infectious matter may be carried into the general blood stream from its situation. This is, of course, in itself a serious consideration.

The position of the upper third molar is such in any but the most abnormal mouths that the thorough cleansing of the buccal surface is an impossibility. This fact indicates at least the certainty of an early carious attack, which once begun, proceeds with rapidity into invasion, due in a large measure to the ordinarily incomplete organization of the enamel covering. The very rapidity with which disintegration does occur in this tooth is a most serious menace to the distal surface of the second molar, approximating, which is too often attacked before the presence of caries in the third molar has been noted.

Decay, if we may so term the condition, soon progresses to the destruction of the pulp vitality in the upper third molar, and this in turn to chronic suppurative periostitis, which, because of the type of the bone tissue surrounding the tooth, is rarely accompanied by considerable pain manifestations and seldom developes into an acute abscess. This sequence is far more injurious to the general health of the surrounding tissues, and to that of the body itself, than were the tendency in the other direction. It is particularly unfortunate in this connection that the roots of the upper third molar not infrequently penetrate into the maxillary sinus. The inflammation surrounding the roots of an upper third molar, where this condition does prevail, gradually ascends to include the mucous membrane of the sinus; acute inflammation follows, with its consequent pus and train of other ills; radical operations are demanded and performed and the wholly innocent looking, though frightfully responsible, third molar is usually permitted to remain unmolested because, as far as I have been able to learn, no textbook of dentistry and no general anatomy recognizes the fact that the posterior floor of the sinus not infrequently dips down sufficiently far to include a portion of the roots of the upper third molar.

I will now return to my statement that the proper cleansing of the buccal surface of the upper third molar is practically an impossibility and to give you the reason for making it. Upon opening the mouth widely, the buccal mucosa is pressed tightly against the upper third molar, when this tooth is in position, by the coronoid process of the lower jaw. This makes the complete insertion of the brush an impossible task, when the mouth is well opened. (As proof of this I will show you slides made from X-ray films, illustrating the relative positions of the coronoid process and the upper third molar when the mouth is well opened.)

Close the mouth tightly and no brush can be adequately inserted and used because of the obtrusion of the anterior portion of the ramus of the lower jaw. My word need not be taken for this fact; proof can easily be made upon the next available patient presenting. Place in the mouth the index finger with the ball of the first phalanx pressing upon the buccal surface of the upper third molar. You will find that as long as you so hold your finger, the mouth can neither be widely opened nor completely closed.

Because of this evil connection between the upper third molar and the lower jaw, the lateral masticatory movements are decidedly limited in all patients having either one or both of these teeth in position. To avoid any misunderstanding upon your part as to my contention in this matter, I will say at this time that all references in this paper to third molars are made to those contained in mouths where all of the other twenty-eight regular teeth are in position. As a matter of fact, where teeth have been removed prior to the emergence of the third molars, they not infrequently become valuable additions to the dental collection, always losing, however, their identity as third molars and never then following the rules laid down for them under usual conditions.

As non-use of the teeth is held to be the chief cause of many of the associated dental diseases, to say nothing of the incompletely masticated food an inoffensive stomach is forced to receive, we should neglect no step that will, if taken, promote the proper functioning of the entire masticatory apparatus. The up-and-down movement of the lower jaw is not sufficient to properly prepare the food for its inception into the body; unimpeded lateral movements are also necessary. As these lateral movements are made with the jaws well apart, when food is placed between the teeth in preparation for deglutition, and as when they are in this relative position one to the other, the lateral swing of the lower jaw is greatly limited when even one upper third molar is in position, I can find no legitimate reason, on this one basis alone, for the retention even for a short period of this offending member.

As dentists it is our duty as well as our privilege to strive to the utmost for the salvation and retention of every tooth. The retention of an individual tooth, for that tooth's sake alone, however, is to be severely condemned. Whenever any of the teeth nullify the very purpose which teeth were placed in the body to accomplish, those teeth should be removed, if a complete correction is impossible.

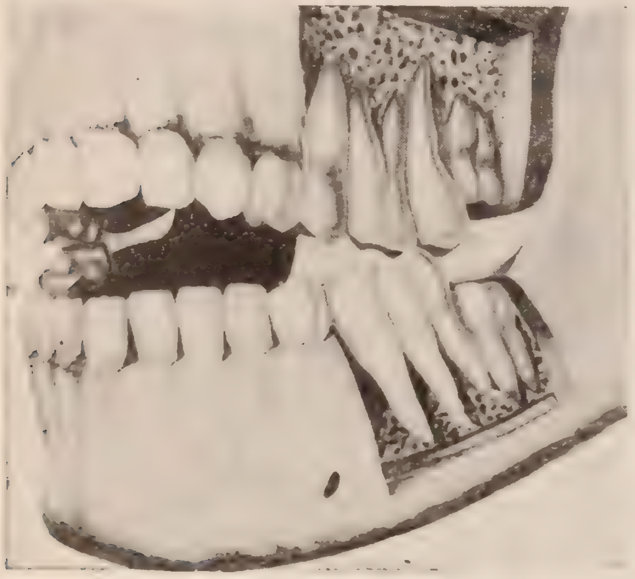

Fig. 1

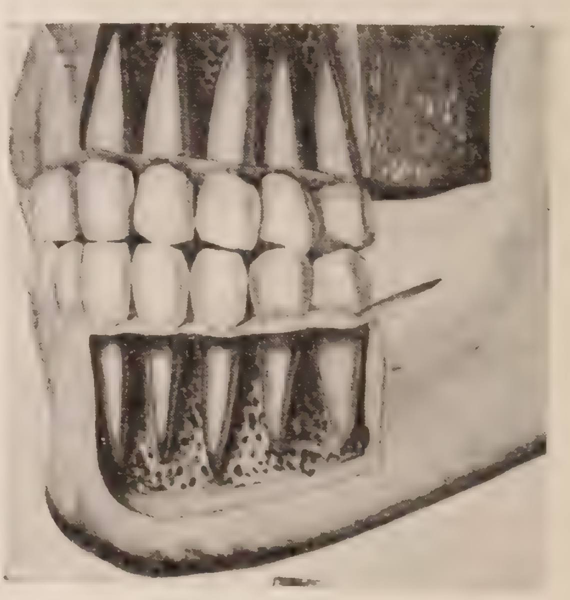

Fig. 2

Do we who are almost constantly working in and upon and about teeth consider as often as we might what is the exact meaning of the word "tooth?" Shorn of technical phraseology, in all simplicity, a tooth, as far as the human organism is concerned, is a hard, dense structure placed in the oral cavity for the purpose of seizing and chewing the food. If one of these structures fails to comply with the laws of its nature, or ceases to perform the functions for which it was created, it is then to be regarded not as a tooth, but as a foreign body; and if a return to its proper functioning is impossible to bring about, it should be disposed of at once. How much more necessary is its removal when, by its very presence, it causes an interference with the proper functioning of the other teeth!

I wonder if the orthodontists have ever given serious thought to the upper third molar and have considered the effect it has upon their carefully-planned and painstakingly-executed labors? When, after months of striving for perfection, they finally see their fondest hopes fulfilled and the distorted jaws made regular, with the entire set of twenty-eight teeth properly placed, on the dismissal of the young patient, do they give thought to that new factor which will enter into the struggle in the form of the upper third molar, which too often wrecks the perfect structure they have built? (See *Figs.* 1 and 2.)

As the average age of orthodontia patients, at dismissal, is several years earlier in life than that at which the third molars erupt, the orthodontist cannot be expected to control conditions at the time of their eruption. You, however, who have the young patients in charge, are responsible to a large extent if, on the eruption of the upper third molar, the proper line of the teeth is again made irregular through this offender which, by its interference with the lateral movement of the lower jaw, impairs the functioning of all of the teeth. If you yourselves do not see it, the extracting dentist does see the wreck of a noble purpose when all too frequently, and all too late, the patient repairs to him for relief.

The upper third molar, when fully erupted, also prevents the proper incising motions of the anterior teeth. As you very well know, the acts of incision and excision are performed by bringing the lower jaw forward to such a position as to place the anterior teeth it contains in front of those in the upper jaw. On pulling the lower jaw backward, the food caught between the upper and lower teeth is cut away from its mass. The impossibility of this performance being arranged to perfection, when upper third molars are in position, can be proven in any average mouth. The disto-buccal cusps will invariably come into contact with the soft tissues overlying the ramus of the lower jaw, pain and incomplete functioning naturally resulting. This result is more in evidence when both of the upper third molars are in position, either for a long period before the attempted emergence of the lower third molars, or for as long a period after the removal of the lower corresponding teeth. In either event the upper teeth, in their endeavor to strike against something, have come down well below their original line. Whenever this state of affairs exists, a decided limitation of the movements of the lower jaw will be found also to occur. In fact, the only possible motion the lower jaw can freely follow will be in the direction of a vertical line. By the removal of the upper third molars, the tension upon the lower jaw is also removed, consequent free movement can immediately be indulged in and the proper functioning of the teeth restored.

As a menace, the upper third molar plays many parts; none so persistently, however, as in its interference with the proper emergence and final placement of the lower third molar. After a not inconsiderable experience with this condition, I am firmly convinced that we should devote less study to the difficulties attending the removal of the lower third molars and more to the causes which lead up to this improper position in which we most frequently find them. It is the upper third molar to which we should direct our study, as, without question, a very high percentage of our troubles with the lower third molar are due to the upper tooth, the elimination of which at the earliest possible moment would, in this same degree, remove from the afflictions the human body is forced to bear, the painful eruption of lower third molars and the consequent chain of evils this condition brings about. If no other means were to be employed, the simple removal of the upper third molar at an early period in its existence would result in the relief of humanity from very much of the difficulty attending and brought about by the eruption of the lower third molar.

It is hardly necessary to remind you that the lower third molar does not erupt with the occlusal surface occupying a horizontal plane. Due to the peculiarity of its anatomical position, forming as it does the end of a concave line, the plane of the occlusal surface inclines considerably. During its formation and progress upward through the bone of the jaw, the anterior cusps lie well below the posterior portion, as may be visualized in the illustration. When we remember that, almost invariably, the upper third molar has been erupted for at least two years before the beginning of the attempted emergence of the lower, this position of what might properly be called the embryonic lower tooth is of great significance. (See *Figs.* 3 and 4.)

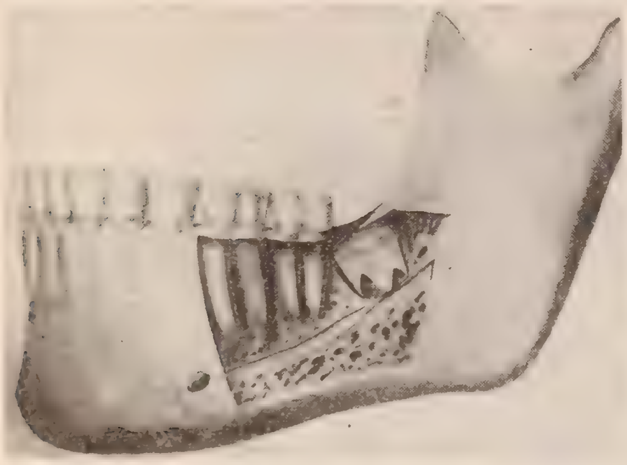

Fig. 3

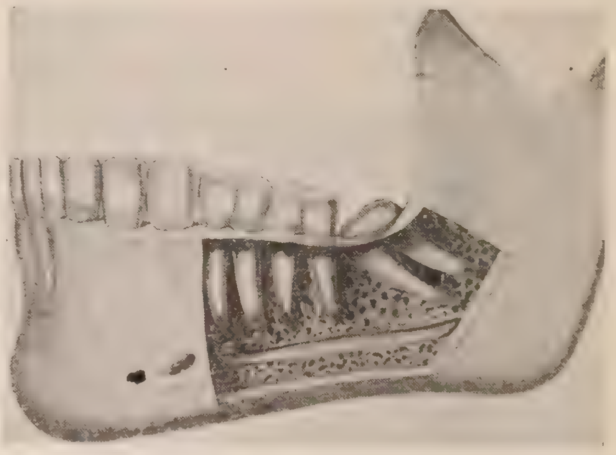

Fig. 4

The tendency of all teeth is to strike against something, and this unrestrained tendency of the upper tooth during its two years' prior existence, brings it not only into full placement but extending far beyond the position allotted it and into the space intended to be occupied by the lower third molar. As the designed position of the upper third molar is at the end of a convex line, the anterior cusps dip down lower than do the posterior. When the entire tooth is lowered below this convex line, this inclination of the plane of the occlusal surface of the tooth places the anterior cusps in such a position that they act as a wedge against the erupting lower tooth, forcing it more and more against the second molar approximating it. This condition is illustrated in *Fig.* 5.

No pain is experienced and no inflammation noted until the formation of the lower tooth has progressed sufficiently far to cause an increased upward pressure. Nature usually follows the line of least resistance and, in the formation of a tooth we will find, invariably, that when the normal process of emergence is interfered with, the root formation progresses along a line against which the least pressure is brought to bear. This rule holds not only with the third molars, but with those other teeth which are frequently interfered with in their development and eruption, notably the cuspids. As the formation of the lower tooth proceeds, the final location of its root portion is determined by that which the crown portion occupies. When influenced through crowding, whether this crowding is exerted in the lower jaw or by the teeth in the upper jaw, we necessarily have a lower third molar located as nature never intended it should be. This is usually termed, and I will later try to show that it is falsely so termed, an impacted tooth. The striking down upon the lower jaw by the upper third molar influences the position of the lower third molar before the beginning of the emergence of the lower tooth occurs. The normal eruption and formation of a tooth is of such a nature that any abnormal influence, however slight it may be, interferes with that normal development.

In the early stages of the development of the lower third molar, at a time when the occlusal surface of the upper tooth is not infrequently to be found impinging upon the soft tissues of the lower jaw, adequate pressure from below upward is lacking to force the lower tooth through the soft tissues into the oral cavity itself and, in consequence, no pain is experienced at this time. The adverse influence of the upper tooth is, however, being exerted.

When the middle third of the root portion has been formed under favorable conditions, the occlusal surface of a tooth issues forth into the mouth. Where the crown portion lies misplaced, due to any type of interference, the root formation progresses unhindered as to structure but disturbed as to location. When the development of the root portion has been completed the tendency of nature is to place the tooth where it belongs. Not always does nature pursue this aim immediately and this accounts for the delayed eruption of lower third molars with which all dentists of a large experience are familiar. When this tendency is exercised, however, still assuming that an upper third molar remains as an antagonist until this point in the development of the lower tooth has been reached, opposition is found against the proper placement of the lower tooth not only in the upper tooth but also in the relative position of the root portion of the lower tooth, and by the very dense bone tissue by which it is surrounded. Conflict between the physiological forces, the effort to erupt the lower tooth, and the mechanical force of the upper tooth bearing down upon it, or more frequently upon the soft tissues overlying it, results in a very serious situation, which always follows when two or more opposing natural forces meet. Even here, however, at the first intimation of pain, the removal of that opposition to the proper placement of the lower tooth by the extraction of the upper will usually permit the further progress of the upward movement of the crown of the tooth in the lower jaw and final proper placement will, as a rule, result.

What is the average procedure when a patient of from twenty years to twenty-five years of age complains to a dentist of pains in the lower jaw, exhibits considerable swelling at the angle, accompanied by a marked false ankylosis and difficulty in swallowing? Experience would indicate that a lower third molar is attempting to erupt. What is your method of action in these cases? Do you investigate as to whether an upper tooth is extending partly or wholly into the space intended to be occupied by the crown of the lower tooth or do you, neglecting this probability, by palliative means endeavor to soothe or anesthetize the soft tissues of the lower mouth? Do you utilize trichlor-acetic acid and relieve, not the pressure from below upwards, but of the force exerted from above downwards?

If, upon examination, an upper third molar is found to be in position, the greatest care should be exercised in determining whether or not its cusps impinge upon the tissues of the lower jaw. Whenever the upper tooth is the primary cause of the distressing condition, either direct contact is found to exist between it and some portion of the lower tooth or impingement by it upon the soft tissues overlying the lower tooth. In the latter case, indentations made by the cusps of the upper third molar will be visible upon exact examination.

What are you now to do? With an equipment of thorough knowledge, experience and skill, are you to attempt the always difficult removal of the lower tooth from tissues in an acute stage of inflammation, the result of which, even though successful, entails suffering at least as great as the patient has experienced if, indeed, it is not immeasurably increased for a number of days? Or will you now employ your knowledge of mechanical force and remove the obtruding impediment to the closure of the two jaws and which is the real cause of all the difficulty? The removal of the upper third molar is simplicity itself, with the proper instrument; all pressure from above downwards is relieved immediately and the remaining teeth of the two jaws can resume their former proper relative positions. The relief of the tension in the soft tissues overlying the lower third molar, where such tension exists, is brought about by free incision into them or, if you will, with a cauterant such as trichlor-acetic acid. In aggravated cases the entire disappearance of pain and swelling will require several days.

Where patients, or where their dentists or physicians for them, hesitate to place themselves wholly in my keeping and express a doubt as to the accuracy of my explanation of conditions as I see them, and object that they cannot understand why, when all of the manifestations of difficulty are so evidently in the lower jaw, I insist that the trouble can all be removed by the extraction of a tooth not in that jaw but in the upper, I usually can make them understand by painting a word picture of a nail in a shoe. If you had a nail in your shoe which, through neglect or ignorance on your part as to the exact conditions, had by continued pressure caused a degree of inflammation to be brought about in your foot, would you cut a hole in the foot to relieve the pressure or would you remove the shoe and then the nail therefrom? The second objection to be met with is that it seems a shame to extract a perfectly good tooth when the trouble is entirely in the opposing jaw. I meet this by saying that the nail in the shoe might be a perfectly good nail also, but that could hardly be a sufficient reason for permitting it to remain as a source of pain and inflammation to the foot.

Where the crowding down of the upper third molar has not brought about this acute distressing condition, before described, in the earlier years of the life of the lower third molar, when pains and inflammation finally do make themselves manifest, and pain and inflammation are almost to be considered necessary concomitants of lower third molars, this certainty of easy relief by the removal of the upper third molar, is lessened to a marked degree. The bone structure, becoming more dense with every succeeding year, may prevent the further eruption of the lower tooth, and then its entire removal, with all of the attending difficulties, is found to be a necessity. The very difficulty of this removal, together with its immediate consequences, is a sufficient reason why we should remove the upper third molar, if it is still in position, even in the mouths of elderly persons, as a first step toward the removal of the lower tooth. It will frequently end the immediate distress, although you are not justified in promising, with any certain assurances, that such will be the happy result.

The tendency of all teeth is to strike against something, and this tendency should never be lost sight of when the lower third molar is under consideration. Even in aged persons, the lower tooth will always come finally into position, if all existing obstacles to its proper eruption are removed. The difficulty is to remove those obstacles. As proof of this assertion, witness the delayed eruption of cuspids and third molars ten and fifteen years after a mouth has been made apparently edentulous and which phenomenon has given rise to the popularly-supposed and widely-heralded "third set of teeth." If the cusps of the lower third molar have not been too tightly wedged into the second molar, below the bulge or belly of its crown, the removal of pressure from above will usually permit its final, belated, proper eruption.

Now a word as to impaction. Ordinarily our picture of an impacted tooth, usually of a lower third molar, is of one lying twisted and in improper position or crowded by the other teeth in the same jaw. As a real matter of fact, the early constructors of our nomenclature recognized that the upper third molars have a most intimate influence upon the final position of the lower third molar or they would never have applied the word "impacted" to that condition in which they are so frequently to be found. Because we have, through ignorance of causes, included under this term many conditions which it does not describe, we cannot conclude that we are the ones who are correct in our position and they necessarily wrong. They knew, when they applied the word "impacted" to a condition met with in the mouth, that its true meaning is not a crowding or distortion of position but is the result of an act of striking; the sudden and forcible contact of two bodies one with the other, one of which bodies is necessarily in motion; in other words, collision. The crowding or improper position is therefore to be considered as the result of an impaction or as the result of other causes. In the case of the lower third molar, these causes might include abnormally dense bone tissue, a very short jaw, an acute angle at the juncture of the ramus and the body proper of the bone. Any and all of these conditions will tend to distort the position of the lower third molar. We may not include all of these causes under the one term of "impact." The Standard Dictionary says specifically that "Impact is the forcible momentary contact of a moving body with another moving body or with one which is at rest." Now, if various causes may be the agents producing a distortion of position and only a suddenly moving body coming into momentary contact with an erupting lower third molar the cause of impaction, where are we to look for that moving body other than in the upper jaw? I say to you that no tooth should ever be extracted without consideration being given to the teeth in the opposing jaw, and to the effect its removal will have upon them as well as to the influence they bear to it while still in position. A lower third molar, in a mouth where no upper third molar has ever been present, lying alone in distorted position as the result of obstruction in the same jaw, is not in any sense an impacted tooth and fortunately for us, is a rarity. It has been our own ignorance of the meaning of words that has permitted us to apply the term to all sorts of conditions without any effort to distinguish between causes.

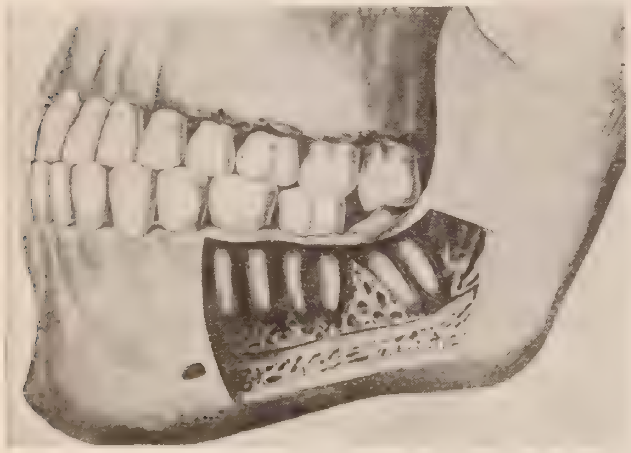

Fig. 5

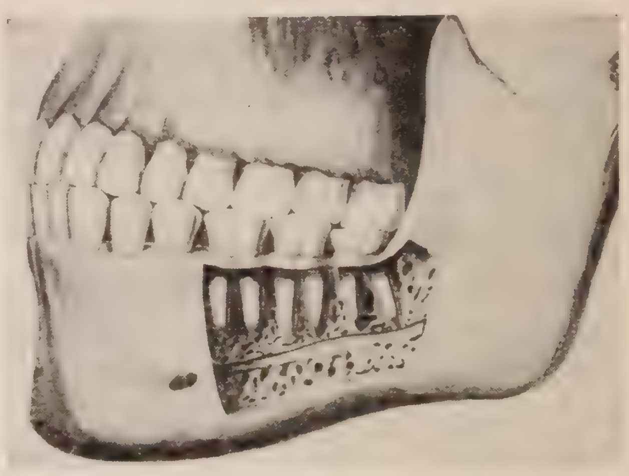

Fig 6

In illustrations 5 and 6, we see before us truly impacted third molars. We might in fancy consider that between the upper and lower teeth soft tissue is present, we still would have the necessary elements of impaction. In this situation illustrated there can be no excuse, whatever, for the difficult removal of the lower tooth or for the criminal removal of the lower second molar in order to relieve the existing pressure, which the veriest tyro can see is being exerted from above. (See *Figs.* 5 and 6)

In illustration 7 we see represented what is frequently called, improperly, an impacted third molar. The shortness of the lower jaw, relative to the size and number of the teeth it contains, is wholly responsible for the incomplete emergence of the tooth. We will sometimes find a much greater distortion of position than is here illustrated, due to the same cause. If the removal of the lower second molar is ever to be justified it is in these cases, because the pressure which is preventing the proper placement of the third molar is being exerted by the second molar forcing the erupting tooth into the ramus of the jaw; or more properly speaking, preventing the erupting tooth from emerging completely from the ramus.

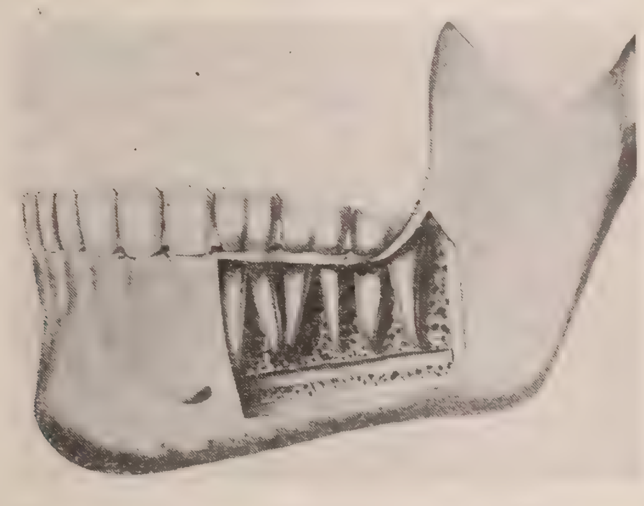

Fig. 7

The pathway of roses and ease was not made to be trod by those whose daily occupation is a consideration and a treatment of the evils consequent and dependent upon the restricted emergence of lower third molars into the human oral cavity. There doubtless always will be pain and a degree of inflammation attendant upon their eruption. Tonight I have tried to show you that in a high percentage of cases the direct cause of troubles connected with lower third molars is not remote in any sense, but lies in the position, the time of eruption and the generally cantankerous nature of the upper third molar.

If, then, this troublesome tooth is to be regarded always as a potential source of evil, we cannot but decide that it should be removed early in its existence in order that the possible ill results of its retention may be avoided.

I could here append case reports by the score were this necessary to convince an intelligent audience of the truth of my contention. If I have slightly interested you, however, I know that hereafter, instead of regarding a lower third molar as situated in the lower jaw and affected only by conditions in that jaw, you will also give consideration to the influences the upper jaw and its teeth bear upon its eruption and placement. Spencer says that: "The position of a thing is inconceivable, save by thinking of that thing as situated at some comparative distance from one or more other things." If we will think of lower third molars as not only situated in the lower jaw, but also as situated with due reference to the position of the teeth in the opposing jaw, there can be but one conclusion in our minds and in our practices, and that will be the definite conviction that, in at least a large number of cases, malplacement of the lower tooth is entirely due to, and may easily be prevented by the removal of, the upper third molar.

Livingston Building.

THE GENERAL PRINCIPLES OF PREVENTIVE MEDICINE AND THEIR APPLICATION TO DENTISTRY*

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WHEN MEDICINE WAS EMPIRIC, dentistry was largely mechanical. Then, there was a wide gap between medicine and dentistry—the teeth being regarded as separate or detached. As soon as bacteriology, chemistry, physiology and other sciences gave a sounder foundation to both medical and dental practice, the inevitable outcome was to draw the two professions closer together and to impress upon physicians and dentists alike the important fundamental inter-relations between the teeth and the body—between the body and the teeth. This progress of science was not an unmixed blessing. The advance was so rapid that surgeons took the bit in their teeth and we had a runaway. Some of these fiery steeds are not yet broken to the harness of science. Thus, surgeons, emboldened by the security of asepsis, performed needless and sometimes meddlesome operations. A perfection of technic was achieved that concentrated upon and gloried in mechanical procedures, sometimes forgetting the patient and disregarding the remote effects of the operation. We often heard the surgeon insist that the operation was a success even though the patient died!

An entirely similar situation has occurred in dental surgery. I refer, of course, especially to root-canal technic, crowns and bridge work. The marvelous dexterity and perfection of operative skill has had the effect of focusing attention upon the mechanical rather than upon the dynamic side of etiology, treatment and end results.

The unifying effect of science has not alone drawn medicine and dentistry closer together, but also has had a like result in other fields of biologic sciences. I emphasize this point, because both the dental and medical professions, as well as the laity, must learn the lesson that the teeth are vital organs of the body, nourished by the same blood, supplied with the same nervous mechanism, and that the teeth influence the growth, nutrition and health of the rest of the body in just the same way that the rest of the body affects the growth, nutrition and health of the teeth. Æsop's fable of the Stomach might with equal force be applied to the teeth.

Dentistry, then, is only one of the many medical specialties. It is, therefore, logical to demand that dentists have the same education given medical students—specializing in the art of dentistry in the same way that ophthalmologists, gynecologists, dermatologists and orthopedic surgeons specialize; that is, only after a sound general foundation in the underlying medical sciences. Now that all American dental schools have voluntarily added another year to their curriculum this will be practical and possible in the near future. The sooner it comes, the better it will be for physicians, dentists, and most important of all, for patients.

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*Read before the Ohio State Dental Society, December, 1916.

It is not alone dental education that needs a broader medical foundation, but physicians also need special instruction in dentistry. It is a sign of the times that Columbia University this year has made a notable start by adding a course of lectures on dentistry in its medical school for medical students. This course will be given by dental specialists who will emphasize the close relationship between the diseases of the body and defective teeth. Instruction in dentistry will, I am sure, soon find a place in all medical schools—even though the crowded medical curriculum is already filled to overflowing.

It is embarrassing to note that our courts at law have been asked to decide the dividing line between medicine and dentistry. It would be just as absurd to ask a zoologist to go to Mexico to find the line of latitude that separates the tropical from the temperate zone. Tradition and convenience have divided the body into certain regional specialties, but no line of division can be found where none exists. Seventeen years ago, the Supreme Court of Rhode Island, in the case of State vs. Beck (21 R. I. 288, 43, Atl. 366), held that "Dentistry is now a well-recognized branch of surgery. A dentist is a dental surgeon. He performs surgical operations on the teeth and jaw and as incidental thereto upon the tissues connected therewith. The sphere of operation then is included in the larger one of physician and surgeon."

The field of work for the dentist has been much extended since that time. The most skillful dentists now operate on many portions of the mouth besides the teeth. The remedying of cleft palate has become a dental specialty and broken jaws are now dealt with in large hospitals by dentists, rather than by general surgeons. The work of American dentists in the army hospitals of the Allies in France during the present war, in treating wounds of the mouth and jaws, and the results obtained in preventing deformities, is one of the achievements of American dentistry.

How absurd it becomes to fuss over the question whether pyorrhea is a dental or medical malady! Must the patient with pyorrhea have a dentist on the one side for local treatment and a physician on the other to administer general treatment? Nevertheless, this question actually has engaged the attention of the Minnesota Supreme Court. It may interest you to know that the Forsyth Dental Infirmary in Boston, recognizing this dilemma, in addition to the usual departments of extracting, orthodontia, etc., has just appointed to its staff an orthopedic surgeon, a neurologist and psychiatrist, several pediatricians and oral surgeons. This brings us at once into the group-system of diagnosis and treatment, which is coming into vogue in medicine. At first thought it seems far from the mark to have neurologists and psychiatrists on the staff of a dental infirmary, but this is in recognition of the close relationship which often exists between the shape and development of the dental arch and mental capacity. The correction of deformity of the jaw and malposition of the teeth may convert the stupid dunce into a wide-awake, energetic youth. Such miracles are among the striking achievements of modern dentistry, and excite the admiration of the student of preventive medicine.

Dentistry, then, has taken a dignified place in the great field of the sanitary sciences. It stands guard at the threshold of many infections and hence becomes an important portal of protection. It is from the standpoint of protection that I wish particularly to direct my remarks this evening.

The dental profession now faces a situation that the medical profession has struggled with for many years. Fortunately, it is not so easy for charlatans, quacks or well-meaning but poorly qualified persons to practice dentistry as medicine. Almost every man thinks himself a pretty good sanitarian, and almost every woman thinks herself a pretty good doctor, but most persons are well satisfied to seek trained dental advice for dental troubles. On the other hand, the relation between the profession of dentistry and the needs of the public demands adjustment. This arises from the fact that there are not sufficient dentists in any community to fill and treat all the teeth. Furthermore, it is out of tune with modern notions of efficiency for highly qualified and expert dental surgeons to cleanse, extract and treat certain minor defects on the surface of the teeth. To take the time of experts to do ordinary manipulations may be compared to paring cheese with a razor. In fact, I am told that only about ten per cent. of dentists are qualified in root-canal technic, and that less than ten per cent. of the people are able to pay the price of such skilled work. It is no criticism to say that only a small percentage of dentists are skilled to perform certain delicate manipulations, for a still smaller fraction of physicians are qualified to do a cataract operation, or diagnose a derangement of metabolism. Root-canal technic requires the highest kind of special skill, coupled with patience, perseverance and free use of radiography.

The improvements in the science and art of dentistry have enabled the profession to do much more than formerly for the prevention of pain, the preservation of health and the prolongation of life. But simultaneously with this larger possibility of service has come the greater cost of the service, so that the skillful treatment of the teeth from childhood to age has become more and more the privilege of the well-to-do, the poor being unable to pay for the costly labors of the accomplished dentist.

Only recently have free dental infirmaries on more adequate scale been provided for a portion of the public in a few of our cities; only recently have dentists been added to the staff of our large general hospitals, and only recently have dentists and dental surgeons been made part of our military establishment, both on land and sea. Only recently has dental service been added to the medical inspection of schools.

We are aware that many other medical specialties, as well as dentistry, have failed to provide a sufficient amount of free or reasonably-priced service at the disposal of the public. This situation is found more particularly in the newly developed medical specialties, and an adjustment is necessary. In order to meet this situation, the public is pressing for the socializing of medical practice. It is one of the complex factors which underlie the present-day social unrest. We should frankly face the problem of a more equitable and just distribution between medical and dental service and the public need. I am sure this is coming in the near future, and should be welcomed both by physicians and dentists.

All wise persons now voluntarily seek the advice of a dentist once or twice a year, whether they have toothache or not. In this respect, dentistry is far ahead of medicine and surgery, for it is still the rule for persons to wait until fever and disease become disabling before seeking the aid of a doctor. We look forward to a time when people will seek the physician while well, to keep well; and the time when we will have a sufficient number of trained physicians who will understand health and its maintenance, as well as disease and its treatment. This is one of the aims and objects of preventive medicine.

This brings up the question of dental hygienists. I understand that some portion of the dental profession has fought against this innovation, just as physicians some years ago fought against the institution of nurses. I am so much impressed with the great practical usefulness and need of dental hygienists as a force for good in oral hygiene and dental prophylaxis that I confidently look forward to seeing a large number of persons trained to practice and teach oral and dental hygiene. This opens up a new field of occupation, especially suitable for women.

The duties of the dental hygienist may be summed up as consisting of:

1. Prophylactic operations on exposed surfaces of the teeth.
2. Chair assistants to dentists, orthodontists and oral surgeons.
3. Teachers of and lecturers on dental hygiene to children in public schools, and to parents and teachers.
4. Statistical workers in dental office practice, hospital service and clinical service.
5. Laboratory assistants in dental research.

Many other medical and surgical specialties find themselves in a similar situation. Thus, the optometrist supplements the oculist by measuring errors of refraction and fitting glasses; the school teacher assists the medical inspector of schools by examining the pupils for vision and hearing. Masseurs and Roentgenologists assist the physicians in therapeutics and diagnoses. In public health work, sanitary inspectors assist the health officer. It has only recently been realized that the public health nurse is one of the best forces for good in the administration of a constructive public health program.

A school for dental hygienists was started this winter in New York at Hunter's College, and another at the Forsyth Dental Infirmary in Boston, on

October 2d. At the present time, there are fourteen students registered at the Forsyth Infirmary and more than that number at Hunter's College.

Dental hygienists will find a place and in turn will be welcomed by the dental profession, and accepted by the public as one of the cogs in the wheel of preventive medicine.

It is plain that dental hygienists should be graduates of approved institutions and obliged to take state board examinations in order to secure a license giving the right to practice dental hygiene under the supervision of the dental profession. Such regulation is important to check abuses and prevent certain dangers incident to movements of this kind.

It will not do to leave this subject without mentioning the name of Dr. M. L. Rhein, who first suggested this new occupation, and Dr. R. Ottolengui, who endorsed the proposition. Dr. Albert C. Fones, of Bridgeport, was the first to successfully try the experiment of the use of dental hygienists for work among school children. The new movement has been helped along very materially by Mr. Edward F. Brown, secretary of the Dental Group, Advisory Council Committee on Child Hygiene, of the New York City Health Department. A bill passed by the New York legislature and signed by the governor on April 5th, 1916, provides that any dental dispensary or infirmary, legally incorporated and registered by the regents of medicine, and having proper standard and equipment, may establish a course of study in oral hygiene for women students. This law further requires that students upon entrance present evidence of attendance of at least one year in the high school. (The Forsyth Dental Infirmary requires four years of high school.) Such students may graduate in one year as dental hygienists, provided they are at least twenty-one, of good moral character and have complied with the preliminary, professional and other related requirements of the statute. This undoubtedly is an historic move in the dental profession. It is a definite and official recognition of the profession of dental prophylaxis, and as such is welcomed by the student of preventive medicine.

There are two pressing problems in dentistry. One is the root abscess and the other is pyorrhea alveolaris. Let us regard them separately, but not so much from the standpoint of cure as from that of cause and prevention. First of all, let us consider some of the facts concerning apical and pericemental abscesses.

I think no one will quarrel with me when I say that abscesses and inflammatory processes about the roots almost always occur around a tooth that is dead or injured. Therefore, the first great indication in prevention is primarily to maintain the vitality of the pulp, and secondarily to prevent injury to the root or its surrounding parts, especially the periosteum, that is, the pericemental membrane.

The living tooth protects itself just as other healthy living tissues and organs protect themselves against the invasion of micro-organisms. A dentist should therefore carefully consider the possibility of remote consequences in needlessly exposing and killing pulp tissue.

How does a living tooth protect itself? It does so by the same mechanism by which other living structures in the body enjoy immunity. Immunity is a question too little considered in dental circles. The living tooth in health is bathed with the same blood and fluid that nourishes and protects the brain, muscles, bones and other tissues. In the blood usually are carried the immunity principles called antibodies, that guard against the invasion of micro-organisms. This power of immunity varies greatly in different persons and in different infections. The mechanism is complex, but is sufficiently understood to be of much importance in not only the prevention, but cure of infectious diseases. It includes phagocytes, antitoxins, lysins, aglutinins, precipitins, tropins and other antibodies, all of which may be demonstrated in the blood by proper biologic reactions. It also includes the vital activities of living cells. This constitutes the new science of immunology. The facts of this science, note well, apply with equal force to the teeth as to all other structures of the body.

The teeth, then, are important organs that do their bit to keep all the other organs and tissues of the body properly nourished and protected, and in return they receive in the general blood supply their own nourishment and protection, which enters through the little arteries in the apical foramen. I do not want to labor the point, but cannot refrain from emphasizing it, because there has been a tendency among doctors, among the laity and among dentists to regard the teeth with a detached view, something like the finger nails or the hair, that can be trimmed or cut without injury. For the most part, tooth substance, once destroyed, cannot replace itself, and therefore the enamel and the dentin especially cannot be compared to bone.

To my thinking, it is important to impress both the profession and the public with the fact that tooth structures should be treated with respect. The enamel serves its purpose, and if filed away, cannot be replaced. Even the shape of the crown of each tooth is important to prevent food pressing upon the margin of the gums during the act of biting. The public, too, must be taught the lesson as part of oral hygiene that to use the teeth when they cannot find a pair of gas-pliers is both hazardous and harmful. The softer dentin when exposed invites the danger of infection, and of course the pulp is the heart of each tooth upon which its integrity depends.

At one time the general surgeon made the mistake of ruthlessly handling, roughly pulling and tugging, or even needlessly sacrificing structures and tissues in the course of an operation. A surgeon with good technic today has a very great regard for all tissues, even subcutaneous tissue, and the conservative and conscientious surgeon treats all tissues with the consideration to which they are entitled. Dentistry apparently has still to learn this lesson, which is of such great importance in the prevention of root abscesses and pyorrhea. It is not alone respect for the structure and shape of the teeth themselves that is important, but consideration for the surrounding parts, especially the edge of the gums, where they join the neck of the teeth, and the pericemental membrane that lines each socket When these structures are injured, with caustics and corrosive antiseptics, they leave a favorable place for the localization of streptococci and other infectious organisms. There is nothing new in these facts. Surgeons long ago discovered that aseptic surgery is far superior to antiseptic surgery, that while antiseptics are sometimes useful in purifying infected wounds, they must be used with care and discrimination, with a knowledge of their action, their chemistry, their limitations and their remote effects. While strong germicides kill bacteria, they also destroy healthy tissue. Dead tissue is a menace. For example, I can take tetanus spores free from toxin and inject them into healthy tissues without producing lockjaw. The spores are engulfed by the healthy phagocytes and soon disposed of. If, on the other hand, I inject the same tetanus spores into the same tissues that, however, have first been bruised or injured, then the phagocytes cannot readily get at them. The spores germinate, and the bacilli thus born find favorable conditions for growth and multiplication, produce toxin, and lockjaw is the result. This is an experiment anyone can reproduce in the laboratory for himself, and is one of our classical demonstrations.

The very same story is more or less true with the streptococci. Streptococci and other micro-organisms often invade the blood and tissues, but in a normal animal they are apt to be swept from the blood stream and disposed of by the phagocytes and other defences somewhere in the interior of the body, but if they should lodge in an injured joint, we then have an inflammation called "rheumatism," or if they chance to lodge in an injured valve of the heart, we have endocarditis, and the same is true of iritis, appendicitis, and ulcers of the stomach. The reason streptococci pick out these places especially is that the blood supply is imperfect and readily interfered with. The more vascular a structure, the less liable it is as a rule to invasion by these pesky micrococci. Thus, the lips, the tongue and the mucous membrane lining the cheeks are much more susceptible to injury than the teeth; in fact, these soft parts almost every day are insulted with bites, pricks and little wounds. Virulent streptococci and other micro-organisms capable of causing serious infections are constantly in the mouth. Nevertheless, these soft parts so frequently exposed are seldom infected. They are protected by their rich blood supply, which comes close to the surface and gives them their ruddy appearance. Hence, when one of these vascular surfaces is injured, there is at once focused upon that injury all of nature's protecting agencies. On the other hand, the gums are by comparison poorly supplied with blood, and the teeth, of course, except the pulp, are quite avascular. These facts at once give us a clear understanding why teeth and the surrounding parts become so frequently infected, and once infected why it is often difficult to effect a cure.

The next point in logical order is to consider the relationship these root abscesses have to affections in distant parts of the body. Just as cancer will form metastases or secondary nests in remote parts of the body, so will streptococcal abscesses. The streptococci are readily transported in the lymph channels, or swept along the blood stream, and land in the joints or other favorable places to set up trouble. There is no doubt on this point. It is now a well accepted fact in pathology; in fact, metastatic processes are so common that they are regarded as the usual or normal method of dispersion of some kinds of infection. The only strange thing about this story is that the foci about the teeth should so long have been overlooked as mischief makers. It is much to the credit of the dental profession that they were the first to point out this relationship from the clinical standpoint, although it remained for those working in the pure science of bacteriology to prove the facts. The game works both ways, or, as chemists say, the action is reversible; that is, the teeth usually are the primary seat of infection and the joints or heart secondarily are involved. On the other hand, the joints or tonsils or glands may hold the primary abscess, and the teeth become secondarily involved, especially if dead or injured.

Sometimes the removal of the primary focus of infection will effect a speedy recovery of the secondary foci, but when the secondary foci have become established, it is not reasonable to expect good results from the removal of the first nest. In that case, the secondary foci may in turn become primary foci of dissemination. Dentists should not expect, and the public should be taught not to expect immediate results following extraction; spectacular cures are not the rule. The occasional dramatic cures have given the impression that the healing of foci about the teeth should always give immediate relief to secondary foci; any such expectations will meet disappointment, for unfortunately the secondary foci becomes too firmly established before relief is sought. Hence the importance of early diagnosis and treatment, from the standpoint of preventing complications and sequelæ.

Now the micro-organisms usually associated with these processes are the streptococci, more rarely the staphylococci. The streptococci are invasive and evasive. They do not primarily tend to produce pus. That is more a characteristic of the staphylococci, in fact, abscess formation is not always found in streptococcal disease. A typical example of this is erysipelas, which is a characteristic streptococcal infection, in which there is swelling, redness, pain, edema, but very rarely formation of pus. A local streptococcal infection may be so slight as to cause only a faint suggestion, scarcely perceptible, in the shadow picture.

The power of making trouble does not depend upon the size of the process, but upon the kind of micro-organism that causes it. For example, the staphylococci are comparatively benign. The disease they produce is usually local and while they tend to form gum boils and painful local swellings, they show little tendency to spread. The streptococci vary greatly in virulence, from those that are entirely harmless to those that are exquisitely virulent; in fact, some of the most potent cultures we have in the laboratory belong to the streptococcal group. This great difference in the power of the streptococci to do harm and the various ways in which they do harm, and the varying tendency they have to invade other tissues, is one of the great lessons that we must learn to keep before us with reference to the prevention and treatment of root abscesses. In other words, streptococci vary greatly in size, in pathogenicity, in invasive power and in the character of the lesions which they produce. The group is large and miscellaneous and furthermore, is not well defined. In fact, I have a certain amount of hesitation in speaking of streptococci as a group. Bacteriologists are by no means agreed as to what is a streptococcus. Perhaps more work and thought have been devoted to this group of organisms during the past ten years than to any other in bacteriological laboratories, yet no satisfactory classification is known. The pneumococcus, for example, resembles the streptococcus, and by some is classed in the same group. It would take a very long time simply to read all the names of all the streptococci that have been described. Recently I have been working with an organism which is round, and sometimes grows in chains, and it therefore bears a certain resemblance to the streptococcus. This organism is obtained from infantile paralysis, and by some bacteriologists is considered the cause of this disease. A discussion is now rife as to whether these particular cultures are streptococci or not. But how can that question be answered until we have a clear definition of a streptococcus? If an inhabitant from Mars looked down upon us with a strong telescope, he would see minute objects moving about, and if he classified all those having two legs in one group, he would put man and ostriches in the same category. This is just the situation in which bacteriologists find themselves with reference to streptococci. Bacteriologists sometimes forget that it is not what bacteria look like, but how they act and what they do that determines their systematic position.

I dwell on this point for the reason that one of the leaders in American dentistry wrote me only within a month with reference to the talk I am giving this evening, "What we want to know is how much infection is too much." From what I have said, it must be plain that it is not a question of quantity of infection, but its *quality*. In other words, these inflammatory conditions about the teeth should be treated according to their cause rather than their size. In some instances, the cause can be determined readily by comparatively simple bacteriologic procedures; but before any satisfactory method is finally decided upon, we must know more about the various streptococci and their varying behavior. Consequently, it is plain to me that before the many questions which arise with reference to root abscesses can be answered with any degree of finality, we need a large amount of scientific work, extending over a period of years, that will correlate the kinds of streptococci found with the kinds of lesions and disease they produce. I understand this is one of the problems being studied in the Dental Research Institute.

The same situation holds true for pyorrhea. Its prevention and treatment will vary with the causes, for it must be clear to all that pyorrhea is not a single infection, amenable to one treatment, but rather a group of infections. To my way of thinking, it would be just as rational to speak of the prevention and treatment of "fever," or the prevention and treatment of "inflammation of the finger," as to talk of the prevention and treatment of pyorrhea all under one head. The periosteum of long bone is subject to all sorts of inflammation, abscesses, exostosis and other pathological states, but these are not grouped as one disease, nor is any attempt made to formulate a single line of prevention or cure. The only way in which real progress can be made in pyorrhea, as well as in other problems in dentistry, is through scientific research. In brief, the burden of the message I bring is that a routine method of preventing or treating all root abscesses or all cases of pyorrhea is not rational, and that the need of the hour is to differentiate the different infections as to their causes, modes of entrance and methods of attack. When this is done, each condition may be recognized by proper methods of diagnosis, and treatment instituted to fit the particular disease with which the patient suffers, for these different infections are different diseases, even though the manifestations are sometimes singularly alike. This is one of the problems that can only be solved by the scientific method of research in laboratories devoting their time and energies to such purpose, such as the Dental Research Institute at Cleveland, so ably presided over by Dr. Weston A. Price.

Oral prophylaxis centers in the word "cleanliness." Cleanliness is the heart and soul of hygiene and sanitation. The sanitarian is inclined to place it even before godliness—for cleanliness of body, cleanliness of mind and soul, and cleanliness of our surroundings is essential to a full appreciation of the spiritual virtues.

Our conception of cleanliness has greatly changed with our advance in knowledge of the kinds of dirt, the degrees of dirtiness and the nature of these dangers. We are no longer satisfied with physical or esthetic cleanliness, but insist upon biological cleanliness. A tetanus spore or streptococcus on the shining surface of a dental instrument makes that instrument filthy and dangerous, whereas many such spores or many such streptococci may be found upon the skin of a chicken which, however, may be entirely harmless when eaten.

I have heard it said, "The mouth is the filthiest part of the body." At one time or another, it receives almost every kind of parasite, bacterium, protozoon, eggs and larvæ of worms, and even insects. Furthermore, the mouth is an ideal incubator for many micro-organisms that there find perfect conditions for growth and multiplication. In the mouth is found just the right temperature, moisture and abundance and variety of food supply, acid and alkali reactions; ærobic places on the surface and anærobic places in caries, fissures, crypts and other nooks. Both in numbers and varieties, the microscopic population of the mouth often outnumbers that of any other part of the body.

There are three ways of keeping the mouth clean: (1) Preventing dirt and infection entering the mouth; (2) through mechanical cleansing; (3) by virtue of sound teeth, healthy mucous membranes, normal tonsils and tissues.

So far as prevention is concerned, we can do much to keep dirt and disease out of the mouth. This brings up the whole question of pure food and clean drinking water, but to discuss this important problem would carry us far afield from our present subject. The relationship, however, must be clear. I am loath to dismiss this topic, with such scant mention, but time forbids further discussion upon its importance in oral prophylaxis. Likewise I will have to be content with merely mentioning the question of street dust, house dust and factory dust, which carries dirt and sometimes infections into our mouths, often in sufficient quantity to taste it and feel its grittiness. The great problems, therefore, of municipal sanitation, industrial hygiene and household hygiene have a bearing upon oral prophylaxis.

Personal hygiene and sanitary habits are the chief means of keeping dirt and infection out of the mouth and nose. “Dinner, dirt and diarrhea” too often get sadly mixed through “fingers, flies and food.” People must be taught to keep their fingers away from their mouths and nostrils and always to wash their hands before eating, before handling food, and after leaving the toilet. How many households have a wash basin, with hot water and soap near the water-closet in order that the cook may obey this simple injunction? Recently I made a sanitary survey of one of the finest mansions in our metropolis, and when I mentioned the lack of such facilities, the lady of the household was shocked, for she said she had never heard of such a thing. Afterwards she berated her mother for not telling her, and the mother said, “What, child, do people do that? I never heard of it!”

Think of a bacillus carrier like “Typhoid Mary” visiting the toilet and then preparing the salad, milk and other food for the table, without any pretense or facilities for washing her hands. It is no wonder that she left a trail of disease and death wherever she cooked. It has gone out of fashion to call typhoid fever a“filth disease,” but to the sanitarian it is one of the filthiest of all diseases. Each case of typhoid fever represents a short circuit from the anus of one person to the mouth of another.

The way in which streptococci and the various bacteria responsible for caries and other diseases of the mouth are spread through the saliva emphasizes the importance of education in personal hygiene based upon habits of biological cleanliness.

“Not only is the saliva made use of for a great variety of purposes, and numberless articles are for one reason or another placed in the mouth, but for no reason whatever all unconsciously the fingers are with great frequency raised to the lips or the nose. Who can doubt that if the salivary glands secreted indigo the fingers would not continually be stained a deep blue, and who can doubt that if the nasal and oral secretions contain the germs of disease these germs will not be almost as constantly found upon the fingers? All successful commerce is reciprocal, and in this universal trade in human saliva the fingers not only bring foreign secretions to the mouth of their owner, but there, exchanging it for his own, distribute the latter to everything the hand touches. This happens not once, but scores and hundreds of times during the day's round of the individual. The cook spreads his saliva on the muffins and rolls, the waitress infects the glasses and spoons, the moistened fingers of the peddler arrange his fruit, the thumb of the milkman is in his measure, the reader moistens the pages of his book, the conductor his transfer tickets, the "lady" the fingers of her glove. Everyone is busily engaged in this distribution of saliva, so that the end of each day finds this secretion freely distributed on the doors, window sills, furniture and playthings in the home, the straps of trolley cars, the rails and counters and desks of shops and public buildings, and indeed upon everything that the hands of man touch. What avails it if the pathogenes do die quickly? A fresh supply is furnished each day. Besides the moistening of the fingers with saliva and the use of the common drinking cup, the mouth is put to numberless improper uses which may result in the spread of infection. It is used to hold pins, string, pencils, paper and money. The lips are used to moisten the pencil, to point the thread for the needle, to wet postage stamps and envelopes. Children "swap" apples, cake and lollipops, while men exchange pipes and women their hatpins. Sometimes the mother is seen "cleansing" the face of her child with her saliva-moistened handkerchief, and perhaps the visitor is shortly after invited to kiss the little one.

"Children have no instinct of cleanliness, and their faces, hands, toys, clothing and everything they touch must of necessity be continually daubed with the secretions of the nose and mouth. It is well known that children between the ages of two and eight years are more susceptible to scarlet fever, diphtheria, measles and whooping cough than at other ages, and it may be that one reason for this is the great opportunity that is afforded by their habits at these ages for the transfer of secretions. Infants do not, of course, mingle freely with one another, and older children do not come in close contact in their play, and they also begin to have a little idea of cleanliness."

Probably ninety per cent. of all infections to which man is heir enter the body through the mouth and nose. This is the case not only with diarrheal diseases, such as typhoid fever, cholera and dysentery, but with infections such as common colds, pneumonia, grippe, scarlet fever, diphtheria, measles, whooping cough, mumps, cerebro-spinal fever, sore throat, as well as the diseases which more particularly interest dentists, as caries, pyorrhea and root abscesses. We must again and again insist upon the communicable nature of these infections. Colds are caught from other people having colds, just as diphtheria is caught from diphtheria. Streptococcic infections are caught from other persons having streptococcic infections, just as erysipelas is caught from erysipelas. Streptococci and other micro-organisms that play mischief about teeth and gums are passed from mouth to mouth more or less directly; sometimes indirectly.

Some of the modes of transfer are: Kissing, the common drinking cup, the roller towel, the wash basin, the spoons and cups in restaurants, glasses at soda water fountains, toys, pencil points, and by a thousand and one other ways. It should be carefully remembered that the source of these infections is in almost all cases man himself; that is, one person has the infection, or harbors the infectious principle as a carrier, and thus passes it on to others. For example, Arctic explorers, exposed to chill and damp and to all the rigors and hardships that are commonly supposed to produce common colds, seldom have these ailments in the solitude around the frozen poles, but upon return to civilization they are very liable to colds through contact with their fellowmen. The engineer in the locomotive cab is not nearly so apt to catch a cold as the passengers in the stuffy, crowded and dusty coaches and Pullmans. It is well known that wounds received in the virgin forest, far removed from civilization, usually heal without trouble, whereas trench wounds in the present warfare, contaminated with the dirt of fields that have long been cultivated and manured, are especially liable to severe and dangerous infections. Streptococcic complications formerly were very common in wounds and fevers. For example, the severe and serious complications of scarlet fever are in almost all cases due to virulent streptococci. Severe cases of scarlet fever are no longer the rule—in other words, the disease is becoming milder—because, perhaps, general asepsis and biological cleanliness has diminished the number and prevalence of these virulent forms of streptococci so that the chances of contracting this complication is lessened and we therefore now seldom see the malignant and hemorrhagic forms of the disease.

A well-recognized method of spreading disease is through droplet infection. A fine spray leaves the mouth and nose during the acts of coughing, sneezing, singing and talking, especially in pronouncing the labials. If you watch a person sneezing into a sunbeam, you actually can see this spray as a cloud of mist leaves an atomizer. Some persons are juicier than others, and often in normal conversation give you a shower bath. It is true that as a rule these particles of germ-laden moisture soon fall, so that the danger from droplet infection usually is limited to a few feet within the immediate neighborhood of the infected person, although occasionally these droplets may be carried yards by currents of air.

The dangers of thus contracting infections in close offices—especially in dentists' offices—or on street cars, in moving picture shows and other crowded places, is obvious, and I believe occurs more frequently than we are inclined to admit.

Another way in which infections from one mouth may spread indirectly to another mouth is as follows: A patient having a cold enters the dentist's office. The patient coughs and sneezes, and in obedience to modern teaching, holds his hand before his mouth and nose, thus receiving the full force of the spray into the palm of the hand. The patient now shakes hands with the dentist, and thus transfers the infected stuff to the dentist's hands, who perhaps shortly after carries his hand to his mouth or nostrils, and the trick is done. Next day the dentist has a cold and attributes it, perhaps, to the fact that he sat in a draft.

The mouth, including the teeth, gums and tonsils, affords a broad surface and readily accessible means of entry for the various micro-organisms which get into it in the various ways that have been detailed. The principal channels by which the bacteria and their poisonous products enter the system from the mouth are through the tonsils, gums and roots of the teeth. The teeth vie with the tonsils as portals of entry for infection. The open, exposed, ulcerated or decayed tooth is not always the worst in this respect. More harm may be done by the heavily-crowned, capped or bridged teeth, under the poorly-fitting margins of which bacteria flourish. The abscesses are often situated deep down at the roots of the teeth. These "blind abscesses" may remain dormant a long time, but ultimately open into the mouth by way of a sinus. Often they work their way into the bone, causing disintegration.

Poorly-fitting crowns are often the cause of trouble. Many a case of arthritis has been cured by a correction of dental work, removal or filling of ulcerated areas and insertion of proper bridge work. Often it is possible to drill into the abscess and in this way provide drainage for the pus. Thus, the tooth may be saved. Usually extraction is the most satisfactory procedure, and often must be done in the end. This decision, however, should be left to the dentist and physician co-operating together, each of whom, however, must clearly understand his responsibility and the possibilities of future danger. It seems a contradiction of terms to say that conservative dentistry often consists in extracting instead of saving teeth. Surely it is better to sacrifice a tooth than the patient, for efforts to save teeth may have this unfortunate result.

One thing is certain—it is not good practice to wait until neuralgia, sciatica, stiff neck, inflammation of the gall bladder, rheumatic inflammation of the joint, or some other serious complication occurs before seeking the cause of the trouble about the teeth. In fact, it may be too late when secondary foci are established. It is common sense to look for abscesses about the roots and treat them before they cause secondary trouble. The situation is precisely as it used to be with caries when persons waited until they had toothache or a gum boil before they sought dental care. How much more sensible to use preventive measures and avoid much unnecessary pain and suffering! Would it not indeed be fortunate if X-ray pictures could be made a routine part of the dental prophylactic examination once a year? Furthermore, we must keep clearly before us the fact that these focal infections about the teeth do not always give rise to secondary foci that may be recognized readily, but may produce general manifestations such as fever, or may simply reduce strength, sap vitality, diminish resistance, and predispose to other diseases. These disabling states often interfere more seriously with the efficiency and happiness of the individual than definite secondary foci.

It is well to put a child's teeth in good order for once, and at the moment the child leaves the dental chair; but it is better to teach the mother or the sister at home how to keep that child's mouth in good order. The conservative ends of modern dentistry cannot be fulfilled without the following-up method of the modern hospital. Dr. Eliot says that "The addition to a dispensary or an outpatient department of a hospital of that kind of social service which follows up the patients, teaches somebody at home the continuous treatment which should be administered, and sees that the patient returns to the hospital or dispensary again and again until the cure is effected, is the most important addition that has been made within my memory to hospital and dispensary practice."

Public instruction in dental matters must be still broader than this, for it is not sufficient to fill cavities, clean out peridental abscesses or heal pyorrhea. We must guard against reinfection and instruct such persons in the principles of oral hygiene, in order that they may protect themselves against a recurrence of the same trouble. Every inflamed area in the mouth should be treated and eradicated as soon as discovered. The prevention and relief of suppurative abscesses in the mouth are of such vital importance all through life that people should be taught that they may give rise to serious and incurable disease.

This seems as good a place as any to say a word about the ventilation of the dental office. The feelings of fatigue, lassitude and disinclination to work towards the end of the day are often brought about by the bad air of the operating room. By bad air we do not mean air that has been partly robbed of its oxygen and vitiated by an excess of carbon dioxid. It has been found that a slight change in these chemical constituents of the air has no appreciable effect upon health. When the sanitarian speaks of bad air today he refers to its physical conditions rather than to its chemical composition. Much of the mischief of bad air is due to the fact that it is not the chemical change in the atmosphere which saps the energy of a person so much as an overheated room which is at the same time dry. Furthermore, long exposure to a warm, dry air makes the mucous membrane of the mouth and nose soggy, keeps them congested and predisposes to colds and other infections. You will be surprised to find that if you keep the temperature of your operating room around 65 degrees F., and sufficiently moist, how much it will add to your efficiency, comfort and health.

All this is not so far removed from dentistry as it may seem, for it concerns not only the public in protecting themselves against infections of various sorts, but also concerns the dentist in protecting himself and his family. The nature of the work brings dentistry into one of the industrial hazards. It is, therefore, part of the present thesis to urge the hygienic duty of the dentist to himself. The long hours, prolonged standing in close quarters, and the danger of infection demands special care to guard against infection and maintain health and vigor.

Reverting again particularly to the cleanliness of the mouth with reference to oral prophylaxis, we come to mechanical means of keeping the mouth clean. For this purpose we can well content ourselves with a toothbrush, some silk floss and clean water. A little soap or some dental powder, free of grittiness, helps to cleanse the surface of the teeth. This will to some extent prevent the accumulation of tartar on and between the teeth. For the most part, antiseptic mouth washes are a snare and a delusion. Flushing and rinsing the mouth with pure warm water helps mechanically to cleanse the surface. It is not possible to add any known germicidal substance to the water that will sterilize or disinfect the mouth. The germs are so protected that no disinfecting agent can reach them, even when applied directly to the infected mucous membrane or gums. Furthermore, *any known disinfectant sufficiently powerful to kill bacteria will injure or destroy the delicate tissues and thereby do more harm than good.* The virtue of most mouth washes and dental preparations consists in their pleasant taste rather than in their germicidal value.

Many of the mouth washes on the market vary but slightly in their composition from those described in either the Pharmacopeia or the National Formulary. Most mouth washes contain substances that are alkaline in reaction, antiseptic in nature, or slightly astringent. Most of them contain glycerine or alcohol. For ordinary cleansing purposes, sodium bicarbonate in water serves a useful purpose.

Those who have made a study of the subject of disinfection and disinfectants are more and more inclined to avoid the well-advertised substances, especially those sold under a proprietary name, and to pin their faith upon the good old standbys. In public health work, we rely on steam, boiling, dry heat or such chemicals as bichlorid of mercury, carbolic acid and the creosols, lime and chlorinated lime or formalin. Each germicidal substance has specific power and distinct limitations. Special germicidal agents have found particular uses in dentistry, such as arsenic, sulphuric acid and formalin. In the choice of a germicidal agent, we should know first of all the virus against which it is aimed, and secondly, its penetrating action with reference to tissues. For example, nitrate of silver coagulates albumin and does not penetrate deeply, whereas the action of formalin does not stop at the point where it is applied. The importance of this in root-canal technic is obvious.

We have now considered oral prophylaxis from the standpoint of prevention, which consists primarily in avoiding infection, then from the standpoint of mechanical cleanliness and disinfection, and it now rests to conclude this topic with a word about the condition of the teeth and tissues themselves. Normal mucous membrane, sound teeth and healthy tonsils are the best protection we have against the invasion of microscopic parasites. For example, in the case of diphtheria bacillus-carriers, it has been found impossible to rid the mouth and throat of these germs until tonsils, teeth, throat and nose have been put in good condition. The normal tissues are able to protect themselves and disinfect themselves, whereas inflamed, bruised tissues invite infection.

Experience is fallacious. Clinical experience often consists in repeating the same mistake over and over again. This is equally true in medical, surgical and dental practice. The only real progress that has been made in the biologic sciences or any other science is by trained investigators, not necessarily in laboratories, but by scientific methods of observation, which, however, are usually best carried on in the cloistered seclusion of research institutes.

We knew nothing at all about malaria until Laveran saw the plasmodium in his microscope. Our real knowledge of syphilis dates from the time that Schaudin discovered the spirochæte in his laboratory. This discovery enabled Ehrlich to work out the specific substance salvarsan on lower animals.

Many a Columbus has sailed the uncharted seas in search of a route to India, but finds instead a new continent. By this I mean that the by-products of science are often of more practical value than the direct object of the research which the experimenter has in mind. Thus, Metchnikoff studied the little transparent water daphnia under his microscope and took note of what they did in the presence of yeast cells. People asked him at the time what was the use of that? When someone asked Benjamin Franklin what was the use of drawing electricity from the clouds, he answered, "What is the use of a baby?" Who can judge the future usefulness of a new fact? Metchnikoff's studies upon the little transparent water daphnia laid the foundation of the science of immunology.

The research scholar seeks truth and is not concerned with the direct or practical application of his discovery. Who would have guessed that studies in England by Perkins upon a method of making synthetic quinin would open up for German chemists the entire field of aniline dyes and substances useful both in medicine and the arts? Furthermore, aniline dyes made it possible for Koch to see the tubercle bacillus, and upon this discovery rests the philosophy of our antituberculosis campaigns today. Hence the control of tuberculosis rests upon the work of a chemist who was trying to make synthetic quinin, but unraveled the chemical composition of analin oil. But this is not the end of the story, for Perkins stood upon the shoulders of the past, and thus we have an endless chain of progress based upon work done in all the various sciences.

When Rothchild studied fleas and their life habits, his friends wondered why he was wasting his time on such a disagreeable study, but shortly after it was found that fleas carry Bubonic plague from rats to man. At once these researches were then promoted to immediate useful and practical value. It is plain that the importance of research cannot be judged by its direct practical value. The indirect effects and indirect benefits often far outweigh any evident material reward. It is often necessary to dig through dirt, sand and clay in order to reach the ore of truth.

It is the same story in preventive medicine. The campaign against plague in California cut down typhoid fever one-half, although no special attention whatever was paid to the latter disease. The purification of the water supply of Hamburg by filtration cut down the general death rate and diminished the amount of sickness not water-borne. The campaign against hookworm disease in Bilibid Prison, in Manila, lowered the death rate from seventy-five per thousand to thirteen and one-half per thousand, by eliminating hookworms, not because the prisoners were dying of hookworm disease, but because the hookworms undermined health and made those affected a ready prey for other infections. The same story holds for dental disease and dental prophylaxis. The collateral benefits of oral prophylaxis are great and wide spread, while general sanitation and personal hygiene help to keep the teeth sound and the mouth sweet and clean.

Dentistry has profited by pure research in chemistry, physics and biology. From the chemist it uses the best materials to fill the teeth; from the physicist it uses X-ray and electric light; from the bacteriologist it uses antiseptic and aseptic methods. Dentistry is a liberal borrower, but it also is a generous lender. The world is especially indebted to two practitioners of dentistry for "God's highest mercy brought by man to man" in the warfare against pain, that is, surgical anesthesia. The achievements of Morton and Wells, as well as those of Miller and Angle, have helped to ease the burden of mankind. I think it is especially appropriate to consider this phase of the subject for the reason that the Dental Research Institute is located in Ohio. This institute, inspired and presided over by Dr. Weston A. Price, is fulfilling its purpose. It is only through work of this kind that enduring progress may be made. I think the dental profession of America is to be congratulated upon the fact that this institute was founded and is being maintained through the generosity and far-sightedness of the dental profession itself. I know of no other profession that maintains a scientific research institute under like auspices

The student of preventive medicine frankly faces the fact that the mass of mankind is diseased, ignorant and unmoral. He has dedicated himself to the task of helping to cleanse, teach and regenerate.

Preventive medicine dreams of a time when there shall be enough for all, and every man shall bear his share of labor in accordance with his ability, and every man shall possess sufficient for the needs of his body and the demands of health. These things he shall have as a matter of justice and not of charity. Preventive medicine dreams of a time when there shall be no unnecessary suffering and no premature deaths; when the welfare of the people shall be our highest concern; when humanity and mercy shall replace greed and selfishness; and it dreams that all these things will be accomplished through the wisdom of man. Preventive medicine dreams of these things, not with the hope that we, individually, may participate in them, but with the joy that we may aid in their coming to those who shall live after us. When young men have visions, the dreams of old men come true.

During this talk it may seem that I have at times strayed far afield from dentistry, but on closer thought it will be found that there is a close bond between preventive medicine and its problems and dentistry and its possibilities. The two need to be brought in closer union and I have tried to tighten the rivets.

DISCUSSION

Dr. Ruggles: During the earlier part of my college work I was taught that the dentin of the tooth was supplied from two sources, from that within the pulp or main arteries, and also from the peridental membrane without. The essayist made the statement, or I inferred as much, that when the pulp was removed the tissue became a dead tissue, and that there was no collateral circulation which supported that tissue. Is that correct or not correct?

Dr. Rosenau: The tooth, of course, receives its nourishment both from the arteries within and from the pericemental membrane, which corresponds to the periosteum, without, and that is why it is so important not to injure this membrane. My understanding is the same as that of Dr. Ruggles.

Dr. Ruggles: There is another point in regard to a rheumatism which becomes secondary infection. I would like to know, for instance, if other joints become infected from this joint, will there be any pus formed from these other infections? Is it a pus-forming organism?

Dr. Rosenau: The formation of pus in a body results from a reaction between the parasite and the host. As a rule the streptococci in certain manifestations do not have a tendency to form pus as do the staphylococci. Yet they will form pus. Sometimes they will disintegrate tissue without forming pus. And the secondary focus may or may not resemble pathologically the primary one. It probably usually does, but it is not necessarily so. If I said that the streptococci do not form pus, I did not mean to say that. I said that the tendency of the streptococci is not primarily to form pus. They cause a disintegration of tissue. You might as well talk about a million animals. Some bite, some buck and some hurt you in other ways. And it is the same with the streptococci. They hurt you in various ways.

An Anti-Flux

There are several articles offered for sale under this name. They work well enough but are not always at hand while every dental office has an ink well or a fountain pen containing ink. This agent makes one of the finest and handiest anti-flux to be had. It is easily applied and very effective.

—F. W. Frahm, Pacific Dental Gazette.

SOME IMPORTANT ETIOLOGICAL FACTORS UNDERLYING MALFORMATIONS OF THE ORAL CAVITY, THE FACE AND THE BRAIN*

BY WESTON A. PRICE, D.D.S., M.S., CLEVELAND, OHIO

(Continued from page 524, July Summary)

AGAIN, I want to emphasize that it is not the type of deformity we wish to study which we recognize as being due to inheritance. This, however, is entirely different. This girl at sixteen years of age has the roots of her teeth but has no crowns on them. She has inherited a deformity. Her father did not have enamel on his teeth. Her grandmother did not have enamel on her teeth, and so for five generations we have the record that the enamel was missing from the teeth in at least one child in the family. Note, please, that the gums are perfectly developed, the roots are in place in the gums and the deformity is entirely due to the enamel; the other structures of the teeth are perfectly normal. The determiner affected the enamel without affecting the dentin, the number of the teeth, the shape of the teeth or any other quality of the teeth. Incidentally, this girl had artificial porcelain put on the same roots so that finally she was able to look quite respectable. That deformity follows almost the same line that color-blindness does.

Here is another type. This is known as a Mongolian idiot; if you would go to any of your state hospitals for the feeble minded you would find from a dozen to several dozen. So perfect is this type that they would be classified all together. The middle third of the face is always imperfectly developed.

Here is still another type of deformity which is due to the glands of internal secretion. I want to stop and speak on the other later, as we will come to it in another slide. Here is one due to thyroid defect. This would be a Cretin. She looks idiotic and the reason that she is only partially normal is that the gland in the neck producing the particular secretion known as the thyroid secretion and parathyroid secretion has not developed; and by giving this little girl thyroid from an animal she becomes normal, as you see her here. That then is one possibly inherited in some cases, but in most cases it is due to the lack of iodin in the soil and therefore is found in certain localities. That lesion predominates in the Missouri Valley. You will very seldom find it east of the Alleghany Mountains or west of the Rockies. Here is another of the same type and after being fed thyroid extract, this little girl became normal; we would differentiate that from inherited deformity.

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*Stenographic report of a lecture before the Iowa State Dental Society.

Here is an Indian girl, which is an entirely different case. This girl was found in one of the passing shows near Cleveland, and we prevailed upon the director of the show to let us make some radiograms and pictures of her head. She was only about one-half of my height, as you see, and at twenty-two years of age she is almost infantile in all her mental and physical development. She did not come to adolescence until she was, I think, twenty years of age. Her father and mother, following the custom of their tribe, put boards on each side of her face and let the head develop between that compression, making a pressure laterally and inward, which seems to have affected the pituitary body, for this girl was infantile until she was nineteen. She did not come to the period of adolescence, you understand, and therefore followed the type of deformity that we know as the Mongolian idiot, which type is sometimes infantile still at forty years of age. When we study the body we find that the central fingers of the hand do not have the bones in proper shape as you will see here, and this can all be traced to a lack of the functioning of the pituitary body. The pituitary body is a little gland in the base of the brain, and in all probability in her case, as in the case of Mongolian idiocy, the gland is forced upward, which is due to a lack of development in the middle third of the face.

Here, now, we have the slides of an important case, an important link in the studies. This boy at sixteen years of age was entirely infantile. That means, to speak frankly, that his sex glands had not developed any more at sixteen years of age than should be the case at four or five years of age, and he had no mustache. His second permanent molars which should have developed at twelve years of age, were not in sight and we have in this boy a mentality of about three or four years of age. He wanted little children as playmates. The left nostril was entirely closed and occluded. He probably had never breathed through it. You could not get air or water through it, and the result was a mouth breather, since he could not breathe through his nose. The boy was a hopeless dependent and harmless, but an idiot. The process of treatment was to move the maxillary bones apart laterally and open the median suture, thereby opening the nares, but more important than that, or quite as important, moving the maxillary bones downward and forward. Here we have a lateral view of the head Here you will notice the relation of the upper incisors to the lower; the uppers are one-half inch back of the lowers; the upper arch went within the lower arch completely. After we moved the bones downward and forward the upper teeth went outside the lowers, and this is shown to have moved downward here, the various bones in the middle third of the face are pushed downward and forward. Within ten days the boy could breathe through his nostrils and there was a great difference in his mentality. In thirty days we have the widening of that arch, which was moved apart, I think, nine millimeters, and that boy could soon breathe through the nostril. In thirty days he could maintain himself through the nostril that was entirely closed when we began. But the most important thing, we considered, was the change in the mentality; I think the next slide will show the difference. Here is the boy from two views—front and side views—and here he is thirty days later. Here he is just a lump of protoplasm, and there he is a boy with considerably more spunk and pep and a great deal more personality. What shall I call him? A human being, I guess, would be a good name. He was more like an animal. Within thirty days his mustache began to show a tendency to grow. Within two weeks that boy's sexual glands developed so perfectly that he passed from an infant to a man. His whole tendencies and desires and playmates were completely changed. Instead of wanting to play with little children and with blocks and things of that kind, he wanted to come with the big people. I could not keep him from wanting to put his arm around my secretary's neck and being very attentive to the two or three secretaries in the office. He wanted to take one of them to the beach to a dance, and his interest was that of a young man, though he did not have all the intelligence of a young man. He did not understand all his normal reactions, but the boy was no longer an infant, but a man in a great many respects. What had made this change? Apparently a stimulation of the pituitary body in the base of the brain, for immediately we found developing changes in that boy that corresponded precisely with the changes that take place with the stimulation of the pituitary body or gland. This is another view, and you will notice particularly the nose in these two pictures, and notice the difference in the middle third of the face.

The next type we want to take up will be the effect of the thyroid operation. Here we have two goats that are brothers. One had its thyroids removed when it was a few days old, and the other did not. This has remained an infant, so to speak, and has also remained an idiot, as you see from its very expression and lack of thought. The difference depicted there is brought out in various forms of life, particularly in tadpoles. Swung has done great work in studying these glands and their effect on forms of life, such as tadpole life, and he finds, as others have, that the feeding of thyroid glands to tadpoles will make them remain tadpoles, if they have no other feeding, for months and months, but at any moment that he would give them one feeding of thymus gland they would cease to be tadpoles; they would drop the tail, put out legs, differentiate and become frogs. So he could have full grown frogs in five days or great big tadpoles as large as his hand, just according to the way he would feed them. We all know that the thymus gland just behind the collar begins to function at about six years of age and ceases to function at about sixteen, and then atrophies. In all probability it has largely the function of determining adolescence. It in turn is controlled largely by the pituitary body and it is a matter of very great importance that this pituitary gland in the base of the brain is connected with the thyroid and thymus glands by an independent nervous system, and also with the adrenalins, and it is a matter of very natural sequence then that the pituitary body, if not functioning properly, would disturb the functioning of the other ductless glands. It is in effect the governor in a large measure of the other glands.

Dr. Harvey Cushing, of Boston, has done some wonderful work in the study of the pituitary gland, and he finds that when he removes the pituitary body from dogs that certain characteristics are produced, and one of them is that they remain infantile. Here we have two brothers and two sisters all from the same litter and from one brother and one sister he has removed the pituitary body by operation, and he has left two of them normal to compare with the others. In a given number of months the brother and sister that were not operated upon have become adults. Their sex glands have normally developed, but the others remain infantile, as you see; there are no mammary glands developing in this female and no more sexual organs in this male than in early puppyhood, precisely as occurs in that type of deformity that we speak of as the Mongolian idiot, and that type is in large part a deformity of the pituitary body or a lack of the functioning of the pituitary body.

I presume the most important work that has been done along the line of the study of artificial disturbances of these determiners has been done by Dr. Stockard, who has found that when animals are subjected to certain chemicals, such as alcohol, that the offspring are always affected, even though the animal itself is not seriously affected. Here is the cage in which he did this treating. A little alcohol was poured onto a plate beneath the grate and the animals were allowed to run around about the grating and breathe the air in which the alcohol was present. He found the remarkable effect that when these animals were mated, the offspring of these mated animals were always under size and that they always had in their second and third generations tendencies to deformities. The next slide will show us a typical deformity. Here is one totally blind coming in the third generation, even though its own parents did not have any treatment. The next slide will show a different type where one eye is developed perfectly but on the other side no eye at all. He found certain types of deformities, brain and nervous troubles which were particularly produced in these succeeding generations. Here are some of the deformities in the limbs of these animals and he found very definitely that the line of descent would be changed completely by the administration of alcohol to one of the parents. You will notice that the ophthalmic development is entirely lacking in one and only partially developed in the other. He also found in the third and fourth generations definite deformities coming out as are shown here in these limbs. We will not stop to discuss this in detail, but note particularly the effect of alcohol on these various animals. When the alcoholic male was mated with a normal female he found that in 90 matings there was early abortion in 37, still-born litters 10, still-born 20, living litters 43, young dying soon after birth 35, and total dead 55, surviving 47, two of which were defective. This was when the male alone was allowed to breathe the alcohol. When a normal male was mated with an alcoholic female the results were not serious. In 33 matings there were 7 negative results and 21 surviving young. When he mated an alcoholic male with an alcoholic female there were 41 matings, 20 negative results and 4 still-born litters, 8 still-born young, 17 living litters, 12 young dying soon after birth, 20 total dead and 14 surviving. There should normally be from one to two living and growing to adult age in each case of mating. Now we will compare that with the second and third generation. Note this particularly; that in the second generation the female was treated during pregnancy and in four cases there was practically no effect of the alcohol on the offspring. When the second generation was mated with the normal there were 46 matings, 10 cases of negative results, 3 still-born litters and the number of still-born 8, and 6 defective of this 8; there were 37 living litters, 29 young dying soon after birth, two were paralyzed, total dead 37, only 25 surviving, out of which three were deformed. There were 25 where there should have been twice 46, the significant thing being that even though the second generation did not have any treatment with alcohol, nor did the one with which it was mated, there was that very great difference in the offspring. When the second generation was mated with an alcoholic, a very serious result was produced. There were 53 matings, 63 negative results, 8 still-born litters, one very badly defective out of 17 still-born, and out of 29 living litters there were 22 young dying soon after birth, leaving only 28 total for development of which several were defective. The third generation was even more defective than the second, even though they themselves were not treated with alcohol nor were their parents treated with alcohol, and if you follow that through in the third generation you will find one had deformed legs, one was paralyzed, six had defective eyes, and so on through these deformities that came out in the third generation, even though, as I stated, only a grandparent was treated with alcohol.

Now, it is exceedingly important when we take the third generation and mate them with alcoholics; we find we have serious defects, for out of these matings there was only one living offspring. In other words, they tend to die out and eliminate the race in the second and third generations, or probably in the third and fourth. It is just exactly what happens in the human family that the descendants of alcoholics die off in the third and fourth generation. But here is one of the most significant things as to relative effect of alcoholizing the male as compared with the female. When the father alone is alcoholized you will find this large percentage of deformities. And when the mother is alcoholized in the second generation there are no deformities. Do you see the very great significance of that? Exceedingly more serious when the father is treated with alcohol than when the mother is treated with alcohol. And when we go through and find the relation of an alcoholic grandfather as compared with the relation of an alcoholic grandmother, it comes out again about as eight to two. And yet the alcoholic grandmother comes out by transmitting her defects to her sons, for her sons were carrying the deformity, a matter of exceeding importance. Now he also found that these various amounts of alcohol such as would be found in the body of these animals, being added to sea water, the fish eggs that were developing developed deformities of the eyes and the nervous system. Here is one with the eyes far apart and one with no eyes; here two eyes grown together, one with only one eye. These are simply characteristic types that were produced and the amount of alcohol, as I say, was practically that contained in the body. Now, here is something very significant. He also found that within twenty minutes after alcoholizing a guinea pig he could get the alcohol in the seminal fluid almost in the same proportion that it was in the blood.

When we compare the effect of other poisons than alcohol, say lead, we find it acts the same way. Here are histories which have been taken of females working in the lead foundries of France, and it has been found that where they were working in the poisonous fumes of lead, in 4 women with 15 pregnancies there were 13 abortions, only 2 living births, only 1 of which lived more than 24 hours; 1 out of 15 children lived more than 24 hours. They also found that in 5 women who had previously had normal pregnancies, but were now subject to lead poisoning in their systems, in 5 cases out of 36 pregnancies there were 29 abortions or premature still-births, 4 living births, of which 1 died in the first year, leaving 3 of the 36 children where the mothers were working in the presence of the lead poisoning. When these women were working intermittantly the effect was almost as great, but note this: When there was only a blue line on the gum, but no other symptom of lead poisoning, they found in 6 cases, 6 women with 29 pregnancies, there were 21 abortions or premature births and 8 living births, but here is the important thing of all: Where the male alone was subject to lead poisoning there were 32 pregnancies, 12 of which resulted in premature births, 20 living births, and of those 20, 8 died the first year, 4 the second and 5 the third—17 out of 20—leaving only 3 of 32 children to live where the father alone was subject to lead poisoning. Why? Because the lead, like alcohol, in the system destroys the determiners, that element that is transferred from one parent to another and which carries forward the element that will make normal inheritance.

Here is a case from my own practice. This boy is a Mongolian idiot, and by following up the history I found that his father was a painter and had a definite lead poisoning at that time. This boy was like the other children you have seen. His father gave up the painting business and went into another business where he was not subjected to the lead poisoning and the later children are perfectly normal. My own belief is that the child is a Mongolian idiot because the determiners were destroyed by the presence of lead in the father's system.

Here is a significant illustration: Dr. Woerber has done splendid research work as to the developing of poisons in the human system. When the kidneys are not functioning properly, this relates to the mother; oftentimes the offspring are poisoned and poisons are liberated in the system. He has found that the same defects can be brought out precisely with these body poisons as are brought out with alcohol and lead—a very significant thing. I have several case histories where the children are defective in part or in large part where the mother during pregnancy was suffering from a very serious kidney disturbance.

If you are studying the mechanism of this process we will study first the ordinary vegetable cell, and have in mind that all cells are the same whether vegetable or animal. They each have a protoplasm, they each have a nucleus and the method of division will be by the division of the nucleus, and the method of feeding or metabolism will be through the protoplasm of the cell. Here is the keynote of the whole work. Here is the point at which the determiners are injured most frequently. When the ordinary ovum in the female cell is fertilized we find it going through certain changes. (This is not any work of my own; it is copied from an ordinary text book.) The chromatin forms in shorter and shorter bands until it makes a definite series of bars as in this picture. The bars are called chromosomes and the number will largely determine the specimen. In man there are 24; in certain animals a hundred, in others 2 or 3 or 12, and so forth. Whenever there is a cell division by fertilization, or any normal cell division, there is a division through these chromosomes and half of the chromosomes goes to each one of the two new cells, and finally we find part of the original determiner going to every one of the subsequent cells. Therefore, every cell of my body today has some of the chromosome material that was in the first cell of which my body was made. As you see these in the motion pictures you will readily observe all these various processes taking place—the fertilization, the division into two, four, eight, sixteen, and the whole process right before your eyes of this formation as it takes place, and you will see this original structure as unit cells floating in the field. The male element takes a large number of forms according to the form of life; this is the human, this the deer, this the swan, and all the various other forms. The part of the cell that carries the element of life is in the neck, here. The most important part, or the important part, is the spira in the neck of the spermatozoan, the other is only the tail, used for the purpose of propulsion.

The next most important period in which there is great sensitivity next to the moment at which the fertilization takes place is the period at which one form goes into another form, the differentiating types. Remember that all forms of vertebrates are so perfectly alike during the first third of their life that you cannot tell one from the other. You cannot tell a human embryo from that of a fish or from that of a chicken or from that of a rabbit or tortoise embryo the first third of their life. They are there all in that row. In the second third you get the differentiation of the several forms. A fish becomes a fish with its gills, and the rabbit and the tortoise and the chicken carry forward the types each of its own and they differentiate in their second period. Now supposing some disturbance takes place in the body at the moment of this differentiation. In a human the offspring may carry a defect like that of a fish, a gill on the side of the neck, and lots of people are born with a cleft in their neck like the gill of a fish because of something taking place at that moment. This is because of the great sensitivity of embryonic life at these periods of differentiation. Here is the human embryo, and if you will compare it in your mind with those you have just seen, you will note here the first and second stages are like the others, but in the third stage we get the differentiation coming over to the human type.

What is the relation of the parents' body to the child's body? So often we hear peoply say, "The mother saw some terrible catastrophy and it was marked on the child." No, it was not; that is all wrong. As a matter of fact the human parent body has almost nothing to do with the type of the offspring, as shown by this simple experiment. The offspring of two white guinea pigs will always be white. It is the absence of a determiner for color; therefore they must always be white. Now, from this female guinea pig the ovaries were removed and in their place were put the ovaries from that black guinea pig. What would the offspring be? Two white guinea pigs, and we say white guinea pigs always produce white offspring. All the offspring were black because the entire mechanism that determined the color and type of this offspring was contained so far as the mother was concerned in the ovaries, the cell that made the germ, or the tissue that made the germ, and the mother had nothing to do with it, and therefore all three of these succeeding families, three different families from that one pair, were black. Then what is the result of mating a black guinea pig with a white guinea pig? White is the absence of color. This white guinea pig mated with that black guinea pig had two offspring and these two were black offspring, for they would always be black in that case. They carry a determiner for black and the absence of a determiner from the other parent. Therefore their offspring would have in four offspring three black and one white; that would be the law. Blondes never could have brunette children. Brunettes could have blonde children provided that one of their parents had determiners that were lacking in that color—the black.

You are all familiar with the same processes in the vegetable kingdom; how in the corn field you get the same type of color of the corn and it is all carried on like Mendel's laws says, and precisely as it is in the animal kingdom. And this presents a most important and beautiful illustration. We have said that the most sensitive period in the life of the embryo is just at the period of fertilization. Just so in plant life we have a sensitive period. All plants are like their preceding generations and this plant should have been like that one, but why is it not? Just at the time the pollen was put upon the blossom it was exposed to sulphate of zinc and we find a change in the determiners, and the whole type of the plant changes and all the succeeding generations from that plant take the new form instead of the old form, an illustration of the sensitiveness of the plant life.

The next shows us the same thing by exposing the plant to radium, which forms this plant into a new type because at the time of fertilization it was exposed to radium; and that is a beautiful illustration of the sensitiveness of this period.

I spoke of the father transmitting certain things to his daughters and not to the sons. Here we have a chart as to the enamel of the teeth; the red is the female, the white the male. This mother had faulty enamel of the teeth. She transmitted faulty enamel to her sons but not to the daughters. In the next generation we find the majority of the defects are in the daughters; it has crossed over to the other sex. In the next generation it is mixed again, but the tendency is to cross. Why? Because the same chromosomes that carry sex determination carry the character determiner for enamel for the teeth. It is not a surprising thing when you compare it with color blindness.

Here is the progeny of a family of feeble-minded persons. Here is the woman, who was feeble minded. She married a normal man. Their offspring were all normal, but one of them was alcoholic. Now when you add alcoholism to a lack of a determiner for character, you will find those children all inherited a weakness from that mother, even though it was dominated by the determiners from this normal father; you find that this alcoholic son had in his offspring two feeble-minded daughters. Notice this same feeble-minded woman married a man who was an alcoholic and a sex offender, and note their children; every one of the descendants from that feeble-minded woman and this alcoholic sex offender are feeble minded, alcoholic and sex offenders without exception. It could not have been otherwise, and every one of the following generations from that fumily are defective, because the determiners were killed, were destroyed by the presence of the alcohol in the system of that father.

To Be Continued

Chimes for West Point

Troy, June 29.—What is said will be the most costly chime of bells in America and one of the most musical sets in existence is being made at the foundry of the Meneely Bell Company, in this city, for the massive tower of Cadet Chapel at the United States Military Academy, West Point, as the gift of Mrs. James M. Lawton, in memory of her father, the late Major General Robert Anderson, who was graduated from the academy in 1825, and who commanded Fort Sumter at the outbreak of the Civil War.

There will be twelve bells in the chime, the largest weighing nearly two tons and measuring fifty-six inches at its mouth.

COMPLIMENTARY DINNER IN HONOR OF DR. L. L. BARBER

AT COMMERCE CLUB, TOLEDO, OHIO, OCTOBER 13, 1916

AT THE COMMERCE CLUB, Friday evening, October 13, 1916, the Toledo Dental Society tendered a complimentary dinner to Dr. L. L. Barber, president of the National Dental Association, attended by some fifty of his local associates and friends and a number of prominent guests from out of town.

The committee of arrangements, under the chairmanship of Dr. J. W. Hartshorn, left nothing undone to make the affair most agreeable to all in attendance. The dinner was one of those perfect little events that help to smooth the pathway of life and break the monotony of the workaday world.

Dr. Everett M. Cook, president of the local society, acted as toastmaster and acquitted himself very creditably. Following is a stenographic report of the proceedings following the repast:

Dr. E. M. Cook, Toastmaster: This is one of those pleasant occasions when everybody present is glad that he is there. And I am personally glad to meet and greet all of you, assembled as we are for the purpose of doing honor to a member of the Toledo society and of the Ohio State society.

When word reached us that our Dr. Barber had been elected president of the National Dental Association, an idea occurred to a number of us simultaneously; the idea that we would like to get a few of his friends together and give him a little dinner. Then we thought a little more about it and concluded that the local society would like to take up the matter as a society. We didn't stop thinking at that stage, as it occurred to us that Dr. Barber had a good many friends in this vicinity or not too far away, who would be glad of the opportunity to come here and show him that they, too, appreciate the honor conferred upon him; and I think that this goodly gathering shows that our last thought was the best, that we had the right conception of the feeling toward Dr. Barber, not only here at home, but over quite a wide neighborhood in this section.

Most of you know that I am not a speech-maker; even if I were, you are not here for the purpose of listening to me. We have many eminent men with us tonight, and we expect to hear from them. First of all, I am going to call upon Dr. Otto U. King, of Huntington, Ind., a man whom all of us know, secretary of the National Dental Association.

Dr. Otto U. King: Mr. Toastmaster, Brother Barber, Members of the Toledo Dental Society, and Friends: I want to assure you that I feel greatly honored in being invited as one of your guests this evening, and to Dr. Barber let me say that no greater honor can come to a man than to have his home friends offer him such a testimonial of respect as this. I can appreciate such an event the more fully because of something similar that came to me a few years ago when members of the Indiana State Society made me a present of this diamond ring, something that I never should have had otherwise. Of course, I appreciate the ring very highly, but above all I appreciate the spirit that prompted the gift, and that it came from men who know me and know me best—men with whom I had worked and am working to the best of my ability for the uplift of our profession and the welfare of humanity.

LAFAYETTE L. BARBER, D.D.S.
PRESIDENT NATIONAL DENTAL ASSOCIATION

I know something about the farm and the growth of crops; and I know very well that unless a man sows seed he will be unable to reap any crop. And I also know that "As a man sows, so shall he also reap." That sowing comes first, and afterward the reaping; and that the reaping is the crop of the seed sown. It is very much like something that I saw at the San Francisco world's fair, where a man was throwing those crooked, polished sticks, called boomerangs. He would throw them away from him, seemingly without care, and they would all fly away from him through the air, but all came back to him. They simply described a circle, and returned to his hand. Life is built on just that plan, and I wish that every man could be made to realize that whatever he gives to the world will come back to him, some time, some how, inevitably. If we could get this idea into our minds it seems to me that we would all appreciate more fully the importance of the work that we have to do.

Last night I walked down the street with a man whom I have known for years. He is a man with a fine mind, and one who has been given the very finest instruction, the most complete education that this country affords; yet today he is a vagabond, having no aim or object in life. Things have been made too easy for him. I have said many times that I will give my child an education, as thorough as I can afford; but I know that even the best of education is not everything; indeed, it is very little, unless it is backed up by a spirit of service. A man may have five talents, or even ten, and unless he is willing to sow, to put all that he has and all that he is into the service of the world, he will remain a child, he never will grow up, he never will have anything coming to him from the world—need never expect to reap.

This man had five talents and did nothing with them. Turn those five talents over to a man like Dr. Price and he will grow and develop, because he is filled with the spirit of service, and has the energy and the will to dig in the mines of the world for the gold of achievement.

You all know Dr. G. V. Black; his is a name that all of us delight to honor; he was a man who accomplished a seemingly impossible amount of work. I once asked Dr. Black how it was possible for him to do so much. He said that there seemed to him to be so much work that ought to be done, and so few able or willing to do it, that he began going to his office an hour earlier every morning and putting in the time at some phase of the work. Soon an hour became too short, and then he went down two hours earlier; that time was not long enough, and then he began working at night also. There is no mystery about accomplishment. Success means Work, Application, digging in while other men are taking their ease.

I would do almost anything to fill every one of you with Dr. Black's enthusiasm for your work. Then your work would be well done, and it would not be difficult. Work that is done with vim never is hard. And we must have a high standard. Too often in life we just let things go, saying, "Oh, that'll do," and know that the work is not done according to a high standard.

I know that Dr. Barber has sown; now he is reaping. I know that he has held up before him a high standard of professional efficiency always, and that he has done his best to work up to it and live up to it.

I want to leave this word with you: We all do get so tired of work, so tired of the humdrum things of life. They seem at times so useless, so profitless. I am reminded of an incident told of Paderewski, the great pianist. He was offered a grand reception. He asked to be excused from accepting the honor intended, because he had to go to his rooms and practice! Somebody expressed surprise that practice was necessary for him, and he said: "If I did not practice for just one day, nobody would know it but myself; if I stopped for two days, only myself and my friends would know it, but if I stopped for three days, all the world would know it." Dr. Barber, this day this passage of Scripture has been fulfilled in your life, for "you have given to the world the best that you have, and the best has come back to you." I thank you.

Dr Cook: We will have a few words from Dr. Price, head of the Research Institute of the National Dental Association. We shall all be glad to hear from Dr. Price, and to know what they are doing.

Dr. Weston A. Price: Mr. Toastmaster, Dr. Barber, and Friends of Dr. Barber's: I am very happy in having an opportunity to share in the honor conferred upon Dr. Barber, for I feel that Ohio has been greatly honored in the selection of Dr. Barber as president of the National Dental Association. And I also think that Dr. Barber's work as president will prove that the National has honored itself, has done nobly in electing him. As members of the research department, we assure you that we shall do all in our power to make the coming year the very best in the history of the National Dental Association.

I think that there is every reason why the coming year should be the very best and brightest in the history of the profession. Never has there been a time when dentistry has made good as it has this year. If you cast your eye over to Europe you will find that one-tenth of the men in the armies are there because of dentistry. Dentistry took men who had been rejected and made them over, made new men of them by fixing their mouths and their teeth and thus fitting them for service. In Canada alone, 50,000 men who had been rejected were taken care of and sent to join the colors and do good work. Thirteen thousand men were sent back from South Africa to England during the Boer war simply because they were unable to masticate their food.

When I realize that something like 50,000 Canadian boys have fallen in the great war, it seems most pathetic that manhood and energy should be so ruthlessly wasted as is being done over there. Yet this very condition, bad as it is, affords opportunities for devotion and sacrifice that are being taken advantage of in heroic manner. A splendid example of this devotion is that told of a member of the Ambulance Corps who stuck to his post, carrying wounded men to safety out of the hell of No-Man's Land, until the last man had been brought out, although he himself had a shell wound that had cut right down to the bone of his shoulder. When the last man had been brought in he went to the hospital himself—not until then.

And that is the kind of grit we want when we take hold of problems in our profession. We are face to face with a grave situation today. Not a man of us can answer all of the questions that our patients ask us. The problem is just as great and calls for as much cool courage as that of No-Man's Land. And great sacrifices are being made, too. The earnestness of members of our profession throughout the entire country bespeaks for us a degree of success and progress never before realized. Devotion that means sacrifice counts for most in the battles for life, as well as in the battles against life.

Relative to the Research Department, let me say that if we are able to carry out all that we have under way during the coming year, I am sure that Dr. Barber will be greatly proud that he is president of the National Dental Association. I want here to pay tribute to the splendid faithfulness of the men who are doing the work.

I have sent out calls to members of the profession, to deans of colleges, to editors of dental journals, and to men in prominent positions, asking: "Can you refer me to a man or men who are competent to come into dental research work?" How many applicants did we have? A great many, but I was simply appalled to find that the men available had so little knowledge of pathology and bacteriology. But these things will right themselves. There are plenty of men willing to make sacrifices, great sacrifices, in order that our beloved profession—and through that profession, the whole of humanity—may be helped. And I wonder how many of us realize that only through sacrifice do we gain power, that the amount of power we have is just the amount of sacrifice that we have made?

Dr. Barber, I think in this coming year you are going to see more men than ever before willing to sacrifice themselves in the cause of dentistry. It is a particular pleasure to me to see you in this honorable office. I long have recognized your faithfulness to the National Dental Association. Whether meeting west, south, north or east, you always have been there, serving on the committees, during long hours attending to the necessary work of the conventions, always doing the heavy work, all for the benefit of the association and the profession. And I wish to express my sentiment in a little bit of poetry that I imperfectly recall:

> If with pleasure you are viewing
> Any work a man is doing,
> If you like him, if you love him—tell him now.
> Don't withhold your approbation
> Till the preacher makes oration,
> Till he lies with snowy lillies on his brow.

For no matter how you shout it,
He'll not know a thing about it;
He will never know the tear drops that were shed.
If you think some praise is due him,
Now's the time to slip it to him—
For he cannot read his tombstone when he's dead.

Dr. Cook: Among our other welcome guests we have Dr. T. I. Way, president of the Ohio State Dental Society. We will be glad to hear something from Dr. Way.

Dr. T. Irving Way, Cincinnati: Mr. Toastmaster, Members of the Toledo Society, Dr. Barber, and Friends: When the invitation came to me, I promised myself the pleasure of coming to Toledo and joining with you in doing honor to our friend, Dr. Barber. For a number of years it was my privilege to preach the gospel of dentistry as I knew it, and since retiring from the duties of an instructor, on the occasion of dental meetings I have indulged myself in "sitting tight and listening," rather than taking part in discussion.

If you will recall to mind, on the cover of the *Dental Cosmos* these four words appear: "Observe, Compare, Reflect, Record," and as relates to discussions, these words form a most excellent text not alone for the dentists but for any professional or commercial man.

While I am desirous of being a good listener, I am most certainly glad to have come to Toledo tonight and, as the opportunity is afforded, to bear testimony to the high regard in which Dr. Barber is held by our state organization and to extend to him the felicitation of his many friends in Cincinnati.

When the governing body of the National Dental Association found that the time had arrived to select a successor to that genial, capable and efficient official, Thomas Hinman, realizing that the responsibilities of the National Association increase as the years go by, and that the administering of the affairs of that body are greater today than they were five, three or two years ago, they were well aware that they were not offering a boy's job to Dr. Hinman's successor, but must select a full-grown man for the important duties of that office.

In this connection I am reminded of an old gentleman of whom I heard recently. This man was long on ability as a financier, but short on the correct use of the king's English. He is very fond of and loyal to the family physician, who was an allopath. Last summer during the absence of his friend, the family physician, his little granddaughter became ill; she grew worse rapidly, and the grandfather was finally prevailed upon to allow a homeopathic physician to attend her. Under his treatment the child improved and made a rapid recovery. Soon after her recovery, and while the family was seated around the dinner table, one of the group said, "Grandpa, you will have to admit that Doctor X. is all right." After a moment the old gentleman replied, "Well, yes, Doctor X. may be all right for infantry but he won't do for adults."

We realize that while offices of less importance may be taken care of by men of less efficiency, a real adult is necessary to administer the affairs of the grown-up National Dental Association. We all agree that the selection of Dr. Barber was a most excellent one, and that he is in every way worthy of the honor. We, his friends, *do not believe* that he will measure up to the requirements of this office. In explanation of this statement, an incident of last summer comes to mind. During the hot days of last July, one sultry afternoon, a man entered a railway coach, selected a seat, removed his hat and placed it on the seat beside him, and was soon buried in his paper. Soon after this a lady entering the coach, spied the apparently vacant seat and sat down beside him. Jumping up, she exclaimed, "Why, I believe I sat down on your hat!" He, looking up with an expression of disgust, replied: "Believe, Madam, believe? You know darn well you did!" So I say emphatically, we do not *think*, we do not *believe* that our friend will measure up to the requirements of the office; we *know* full well that he will.

It is my pleasure as a member of the national and state societies, and personally, to join you in doing honor to Dr. Barber, and wish for him a pleasant and successful administration of the affairs of the National Dental Association in 1917.

DR. COOK: Over at the end of the table at my left I see the genial countenance of a neighbor from Sandusky, Ohio, a man whom we all know and would be pleased to listen to: Dr. Douglas.

DR. J. K. DOUGLAS, Sandusky: Mr. Toastmaster, Dr. Barber, and Friends: It is a great pleasure to me to share this meeting in honor of Dr. Barber. Since I have been in the practice of dentistry, Dr. Barber always has been a very warm personal friend of mine, and I have been, I hope, as good a friend of his. I feel that his election as president of the national is an honor to all of us here in Ohio and, of course, we know that he will make good.

I was not present at the Louisville meeting, nor did I help to make him president, but I am going to the New York meeting, and I think we can all show our appreciation of the selection of Dr. Barber by attending the next meeting, at which he will preside; and I know that such action on our part will be very pleasing to our friend. Let every one of us make a special effort to attend that meeting. We can make ourselves felt, we men from Ohio, and we ought to do it.

I endorse everything that has been said to and about Dr. Barber tonight, and do not know that I can add anything to it. However, there is one incident that I should like to relate which was probably the cause of my early friendship for Dr. Barber. Some seventeen or eighteen years ago I was asked if I would present a paper at the N. O. D. A. meeting, on "The Preparation of Cavities in Bicuspids and Molars." It being the first paper I ever had attempted to give to any society, I was somewhat nervous. At that time Dr. Johnson, of Chicago, was running a series of articles in the *Cosmos* on the Black method of "extension for prevention." Being quite interested in this method, I wrote a paper, illustrating the technic with charcoal drawings, as I understood it. I was terribly scared by one of the discussers who seemed to think that I had misconstrued the meaning of those men, and that I had done them an injustice. I was feeling pretty sore, thinking that perhaps I had made a failure in my first attempt, when Dr. Barber, who was then a stranger to me, took the floor and said that he had seen these men demonstrate and that he was using the method in his practice, and made what seemed to me at that time some over-complimentary remarks about the paper, stating that the essayist had explained the method as he understood it. I don't think that I ever felt so good in my life. He was a friend of mine at once, and friendship has grown ever since. Thank you.

Dr. Cook: Here on my right is another neighbor, one who comes often to Toledo, but who does not come often enough to please us entirely. We feel that he sort of belongs to us. We will be glad to hear from Dr. Hoff.

Dr. Nelville S. Hoff, Ann Arbor, Mich.: I do not come to Toledo as often as I would like; for this and other reasons I was very glad to get an invitation to be with you this evening. I do not think that anything could induce me to miss an opportunity to express my appreciation of the honor conferred upon our friend. So long as Dr. Barber has been practicing dentistry, just so long has he been in attendance at state and national meetings, and pretty nearly as constant in his attendance at the meetings of the Northern Ohio society. It is at these meetings that I have had the pleasure of meeting Dr. Barber, on several very well-remembered occasions. I have learned to know him very well personally as well as professionally. I know quite a little of his qualities of heart, mind and professional ideals, as well as his official relations. It is because of this knowledge of him that I am particularly well pleased to be a member of this group tonight.

Dr. Barber has done a great deal that has placed us under obligations to him. He has done our work for us. I believe that we are ourselves honored because he has been elected to represent us in the highest position that anyone can reach in the esteem and confidence of his fellows in the dental profession.

Ohio has become a great state in our profession in the matter of furnishing presidents for the national society. We have one who is an ex-president of that organization with us tonight. Both of these gentlemen have represented us and the state, and have represented us worthily in the highest position in the gift of the dental body in America, and we ought to be very proud of this fact. We most certainly should honor these men, and you of Toledo should honor your own townsman who has been called to this high position, and you do yourselves credit in endeavoring to honor him. And who has done more than Dr. Barber to represent this city and this state in the state and national meetings? I know Dr. Barber too well to suspect that he has done any of the things that he has done for the sake of the honor you are doing him, or that he looks upon it at all in a personal way. He is not that kind of man. He simply has done his duty as it has appeared to him, for the good of humanity and his love for his profession.

In coming here from another state I feel that I am acting in a double capacity. I represent myself personally, and I also represent the school from which Dr. Barber was graduated. At the request of the faculty of the University of Michigan, I extend to Dr. Barber our most cordial greeting, and the congratulations of his Alma Mater to her son, of whom we are well and most worthily proud. We are glad that Dr. Barber has been called to this higher duty, a position that he will honor quite as much as it will reflect honor upon him. We know that he was well grounded in the ideals and principles of dentistry to start with, and that he has been faithful and true to those ideals and principles all of his life. We know that he will continue to honor both his profession and himself, and to reflect that honor upon the institution of learning that I have the honor to represent here tonight. With such men controlling the destinies of the national organization, I am sure that our profession will make greater progress during the coming year than ever before. No man can hope to have a greater opportunity to serve his profession than now lies open before our friend, Dr. Barber, and I know—we all know—that he is amply able to take advantage of his opportunity to the fullest extent. I thank you for giving me this opportunity to express my personal esteem for a man who has devoted his best years to the development of the highest professional ideals.

Dr. Cook: There is in this goodly company tonight another man, a man who has made good and I am sure will so continue. I refer to Dr. F. M. Casto, vice-president of the great Ohio State Dental Society. I will ask Dr. Casto to say a few words.

Dr. F. M. Casto, Cleveland, Ohio: Mr. Toastmaster, Dr. Barber, Members of the Toledo Dental Society, Gentlemen and Friends: That it is an honor to have been invited and to be present here tonight we cannot gainsay. In fact, it is a very great privilege to be here. Curiously enough, it so happens that this is the second highly estimated privilege I have had in connection with Dr. Barber. The other was the privilege of voting for him for president of the National Dental Association, at Louisville, in July. It will be of interest to the many friends of Dr. Barber to know that his candidacy for president of the National Dental Association was launched entirely by delegates from states other than Ohio. Ohio's delegates had nothing to do with the affair until after Dr. Barber had been practically forced to become a candidate. It must be gratifying to those assembled here tonight to know that Dr. Barber's worthiness, ability and high professional standards were recognized by men in states other than his own, and that they were willing and anxious to exemplify their faith in him by electing him to the highest office within the gift of the dentists of America. It has been my privilege and pleasure to have known Dr. Barber ever since my initiation into the mysteries of dentistry. His professional life and standards have always been an inspiration to me, even though I have come into actual contact with him but very little as compared with his Toledo friends. The inspiration and good received by those of you who come in almost daily contact with him must be inestimable.

The professional lives of such men as Dr. Barber, Dr. Price, Dr. Hoff and others present here tonight reminds me of a little story I heard told by Harry Lauder a few weeks ago. "Over in Scotland there is a quite familiar character known as the public lamp lighter. This position is usually held by a trustworthy man, who frequently retains it for life. As the gloaming is settling over the country, one may sit in his cottage, look out of the window and see the lamp lighter coming down the street, leaving behind him a trail of lights; as he comes along and finally passes on down the street, his course can be followed for a long distance by the lights he leaves behind. The lights he has left behind are not for his own good, but are for the benefit of those who are to travel in that direction."

And so it is with the lives of such men as these in the practice of dentistry—they leave behind them a trail of lights which are to illuminate the way for the younger men who are to follow. I have nothing further to say, as I think the Cleveland message has been well delivered by those who have already spoken, and by the very good message we are anticipating from Dr. Henry Barnes. I thank you for your indulgence, for the invitation to participate in this feast, and I hope that Dr. Barber's administration of the affairs of the National Dental Association will be the best and most efficient in the history of that organization.

Dr. Cook: I am not going to call upon Dr. Barnes just yet. I purposely have kept him waiting, because I know that the longer he waits the better he gets. We are anticipating something pretty good from him. I am now going to ask you to listen to the ex-president of the national society who is with us, and who handled the affairs of his office with great credit to himself and his state—Dr. Brown.

Dr. Homer C. Brown, Columbus, Ohio: Mr. Toastmaster, my long and intimate associate, Dr. Barber, Members of the Toledo Dental Society, and Guests: I assure you that it is an esteemed privilege to meet with you tonight, and in at least some small way to show my appreciation of the worth of the friend whom you are honoring on this occasion. I have known Dr. Barber for many years. We have traveled together on some of the main roads and across some of the short-cuts; we have dined together; we have slept together; we have scrapped together on a great many occasions, some of which were in dead earnest, and I may be justified in saying that in these scraps we have probably split about fifty-fifty. In any sort of a contest with Dr. Barber, the person who can make an even break must not only be some fighter but a good loser as well.

Again I say, it is a pleasure to be here on this occasion, and I wish to commend the members of the Toledo Dental Society for its generous expression of the esteem in which they hold Dr. Barber. I am glad to be present as a representative of the Capitol City of our state, although I had hoped that another one of our local men would meet me here. If you knew the difficulties that I had to overcome in filling an engagement at Columbus night before last, Youngstown yesterday and last night, you would not need to be told how much I appreciate this occasion.

It has been very pleasing to hear the messages delivered by the gentlemen who have preceded me, and I want to assure them of the confidence I have in Dr. Barber living up to everything that is expected of him as president of the National Dental Association. It is needless to say that these new duties which have been placed upon him are going to bring increased responsibilities with them, as well as new opportunities, and I know that he is going to meet both as he has met all other questions, and he will discharge them in such a manner as to bring credit to himself and our profession.

Our friend from Michigan, Dr. Hoff, who still retains a very active interest in Ohio affairs, was born not very far from my own birthplace, although the beautiful Ohio river flows between. In the southern part of this state the people remember with a distinct feeling of pride that Dr. Hoff originally came from Pomeroy, and that he has been called to positions of honor and trust in his chosen profession. It has been my pleasure on different occasions to highly commend the institution represented by Dr. Hoff as a leading dental school. I recall on one occasion when occupying the position Dr. Barber occupies tonight, and speaking before the Michigan Dental Society, I referred to the creditable work done by the dental department of the University of Michigan, but at the same time I reminded those present that whenever they wanted a dean for this great institution, that up to that time they had found it necessary to come to Ohio to get the right man. Dr. Hoff was then the dean and the other men referred to were Drs. Willoughby D. Miller and Jonathan Taft.

Dr. Casto made reference to the fact that the candidacy of Dr. Barber for the office he now holds was promoted by gentlemen outside of our own state, and these men recognized his worth before we of Ohio did so. I must take issue with this statement, since I am very sure that we have always recognized Dr. Barber's worth here in Ohio, but that we were inclined to be somewhat modest and felt that it would be much more appropriate to have such a movement come from the other states.

Dr. Barber, as well as myself, has always taken a very lively interest in the affairs of our profession and its organization. If for that reason either of us should be accused of playing politics, as I confess has been said of me, I suppose we shall have to live it down in some way, if that be possible. If taking an active interest in our profession, and in the affairs of its organization, and doing the constructive work connected with both, is in any sense playing politics, then we probably had best plead guilty. As most of you know, I have been interested for some years in the re-organization of our professional organizations, and for that reason I have been in a position to recognize the necessity for persons being willing and able to do some of this constructive re-organization work. If there were no such persons willing or able, what would become of the interest of our profession, and what position would our dental organizations hold at this time? It is indeed gratifying that there are many who are able to take an intelligent and active interest in matters not directly connected with their own private and personal affairs. That is, men who are willing to make sacrifices such as Dr. Barber has made and will make in the interests of our profession.

In this connection many of us have been called upon to render services in behalf of legislation to better conditions of our representatives in both the army and navy service. We were fortunate enough to secure through the last Congress better recognition for our representatives in these two branches of the service than has been secured in the fifteen years since the Army Dental Corps was first established. The dental profession of this state should appreciate the fact that Senator Atlee Pomerene was our consistent friend throughout this entire legislative campaign and much of our success is due to his untiring efforts. While Senator Pomerene was our leader in Army Dental Corps matters in the Senate, Congressman Julius Kahn, of San Francisco, occupied a like position in the House. In connection with Navy Dental Corps legislation, our leader in the Senate was the Hon. H. C. Lodge. I mention the names of these gentlemen in particular because I am a firm believer in the fact that the dental profession is entitled to know such matters.

It is true we did not secure everything which our association endorsed and advocated, but it is also true that considering various forms of opposition, we feel fortunate in securing the constructive legislation which has recently been enacted. While some are inclined to find fault with some features and some methods, yet it is results that count. In this connection I am reminded of a little poem written by a prisoner when confined in the Ohio penitentiary, as follows:

Don't look for the flaws as you go through life,
And even should you find them,
It's wise to be kind and sometimes blind,
And look for the virtues behind them.
The cloudiest night has a hint of light
Somewhere in the shadows hiding;
It's better by far to look for a star
Than the spots on the Sun abiding.

The River of Time moves ever along
To the bosom of God's mighty ocean;
Don't try your force 'gainst the river's course,
Or think to alter its motion.
Don't waste a curse on this universe;
Remember it lived before you;
Don't butt the storm with your puny form—
But bend and let it go o'er you.

This world will never adjust itself
To suit your whim to the letter;
Some things will go wrong your whole life long,
And the sooner you know it the better.

Don't try to fight with the Infinite,
And at last go down in the wrestle;
The wise man shapes into God's great plan
As water shapes into a vessel.

Dr. Cook: Now, Dr. Barnes, we are ready for you. We know that while Dr. Brown has known our Dr. Barber for a long time and known him well, he hasn't any better friend than you are, and we want you to tell us about it.

Dr. Henry Barnes, Cleveland, Ohio: It is indeed a great pleasure to be present tonight to honor our long-time and mutual friend, Dr Barber. What is life? The pessimist says, "Life is just one damned thing after another;" the optimist says, "Life is just one grand achievement after another." There is no question as to which of these two classes Dr. Barber belongs, and it may not be out of place at the present moment to view the life of our friend from the standpoint of achievement, for we find him, whether in the light of temporary defeat or actual achievement, squarely himself, accepting the situation philosophically.

Thirty years ago this month I attended the annual meeting of the Ohio State Dental Society, held in Toledo. During the meeting Dr. Barber's name was frequently mentioned. He had applied for membership in the society, but because he had permitted an old friend who was under the ban of the national society to occupy his office to demonstrate a special line of work, his application was refused. This, in society work, was his first defeat.

Fully realizing that his friendly action was not intended as a menace to the society, he accepted the outcome manfully and bided his time. Later he applied for and was accepted as a member of the state society, and after several years of work faithfully performed, was elected its president. He was also a faithful member of the Northern Ohio Dental Association and served it as president. During all these years I was intimately associated with him and came to know him and to regard him highly for his manly qualities and professional attainments. In 1902, Governor Nash appointed a new State Dental Examining Board—Dr. Barber, Dr. Brown, Dr. Douglas, Dr. Smith and myself. Again in 1905, Governor Herrick reappointed the same board and we worked together in very harmonious relations. The state was cleaned up and there were less illegal practitioners when our terms expired than at any time during the history of the state. Dr. Barber's counsel and advice was at this time invaluable and greatly aided us in our work.

I was also associated with him in college work in the city of Cleveland, and here as elsewhere his work was always well done.

Tonight we honor him as president of the National Dental Association, and you men of Toledo honor yourselves in honoring him, especially in view of all the past. His life as we view it has been one grand achievement after another, not built up on the downfall of others, but by faithful attention to the work in hand. Truly, "the stone which the builders rejected has become the head of the corner." When such a life of ambition, of work faithfully performed and glorious achievement is considered, we can truly say that the optimist is far ahead of the pessimist, for whatever we may say or think, the one is trusted with great responsibilities, while the other is not trusted in any field of endeavor.

When I hear the complaints of those who do not work, or will not work, and these complaints directed against the men of work and of success, I am reminded of the story of the ten lazy tramps sprawling on the grass. A gentleman passing and noting their laziness, offered a prize of $10 to the laziest. Nine jumped to their feet and claimed the prize—one remained sprawled on the grass. "Here," said the gentleman to him, "the prize is yours." But the lazy one answered, "Ah, put it in my pocket."

Again I say I am glad to be here tonight to honor Dr. Barber, and commend his life of usefulness in faithfully-performed work.

Dr. Cook: Now we have had the pleasure and the profit of hearing from all of our out-of-town guests, and I know that we would all like to hear from some of our Toledo members. May we have a few words from you, Dr. Canfield?

Dr. L. T. Canfield, Toledo, Ohio: Mr. Toastmaster, our beloved friend, Dr. Barber, Members of the Toledo Society, and Friends: I am very glad to say a few words on this memorable occasion, particularly because of the fact that I have known Dr. Barber possibly as long, if not longer, than most of you.

It was my good fortune early in my practice, some twenty-eight or thirty years ago, to come to Toledo. After being here some three or four months, I had the pleasure of meeting Dr. Barber at one of the state meetings, and am still meeting him at these meetings each year. Many of you may not know that at that time it was the custom for dentists not to speak to, but of each other, but I thank God that period has passed, fortunately for all of us; and its passing has been greatly helped by such men as Dr. Barber, who always has been prominent among us because of his courteous, helpful spirit.

I have summered and wintered with Dr. Barber for many years. Personally, professionally and in social and civic relations, Dr. Barber always has been a man who has stood squarely upon his own feet, never trying to lean upon anyone nor to avoid responsibility. He always has extended the glad hand and radiated good will to both old and new members of the profession, and there have been many newcomers since he and I were young men together. And it is for that spirit that we honor him, quite as much as for the highly creditable office to which he has been chosen, through no effort or self-seeking of his own.

I don't remember that Dr. Barber and I ever had a real "scrap," but have agreed to disagree upon many points in the past, and I still consider him a friend. A friend I believe is one who stands up for you in public and sits down on you in private. I think I can vouch for the feeling of every man here when I say we are very, very glad to know of the honors that have been bestowed upon him, honors that in some sense we all share with him. I know of no man who more fully deserves the honor than Dr. Barber. I do not believe that any man in this great state has done more to bring dentistry up to its present high standard than has he. He has been a faithful worker, many times misunderstood and misquoted, but results have proven him to be on the right side at least most of the time.

I doubt that there is a man who does not deem that the profession also has been honored in this honor to Dr. Barber. We of Toledo appreciate it very highly, and I am sure that we will all do all that we can to make his term in office helpful, agreeable, successful and profitable. I thank you.

Dr. Cook: We would like to hear from Dr. Abell.

Dr. Burt Abell, Toledo: I am very much in the position of a certain little boy. A man walked out to the edge of a dock and, looking down into the water, saw a little fellow floundering around down there. He said to the boy, "How did you come to fall in?" And the little fellow replied, "I didn't come to fall in; I came to fish." And so I want to say that I didn't come to make a speech; I came to listen.

Our Savior is said to be responsible for two sayings, one of which is, "A prophet is not without honor, save in his own country." This does not apply in this case, and I want to say to Dr. Barber that if we haven't always told him that we esteem and love him, it hasn't been because the esteem and the love are not there. I would say to him that every dentist in Toledo is glad that he is the president of the national organization, not because the city is honored, Dr. Barber, but because it is you, yourself, who has that position.

A little boy was visiting at a neighbor's. The lady of the house said, "Johnny, don't you want some ice cream?" "Yes, I do that," replied the boy; "it is just the fondest thing I am of!" This election of Dr. Barber is just the fondest thing we are of, and the proudest thing we are of. We are just as glad as we can be that he is one of us, and that he has risen to his present eminent position.

Most of you know that little peach orchard of mine. The day that Dr. Barber was elected I was gathering my first peaches. I made up a basket of the very first peaches picked and sent them to him. The fact that he was to have the very first ones was very pleasing to me. Now, you all know that he couldn't have had my peaches if he hadn't been all right with me.

The second saying attributed to Christ is: "Let him that would be the greatest among you become the servant of all." Most of those who have spoken for us tonight have had something to say about expecting Dr. Barber to "make good" in his new position. But I want to say to you that anybody who knows anything at all about the way Dr. Barber takes care of his patients, the responsibility he feels for and in them, and the way he has made good in his own practice, knows that he *does* the thing to which he sets his hand. I am scared almost to death every time he sends a patient to me for fear that I shall be called "onto the carpet" later on. Work done for his patients simply must be right; and so, of course, we know that he is going to handle his present position just that way also.

Now it stands us in hand to show the whole United States what we think of our president when the next meeting comes along. I believe that Dr. Barber will watch us pretty closely to see if all these nice things we are saying about him and to him are merely empty words, or whether we mean to stand by them and make them actual. When the time comes for the next meeting, let us fall into line and go, even if we never have attended a previous meeting. If you have been going, so much the better. Let us make the next meeting Dr. Barber's meeting, a genuine get-together affair.

Dr. Barber, we are mighty glad that you live in Toledo.

Dr. Cook: I have been looking around to see if Dr. Sepler is in the room. (Chorus, "Just left.") All right; then I will call upon Dr. Allen next.

Dr. D. A. Allen, Toledo: Dr. Cook has said that I tried to beg off; and really it doesn't seem fair for a fellow like me to be called upon to expose his inability after all of these other speakers have had their say. But I do not feel that I should let the opportunity go by to congratulate Dr. Barber upon the honor that we are celebrating here tonight. Dr. Barber, Dr. Harroun, Dr. Cook, Dr. Scheble, Dr. Canfield, Dr. Kuebler and myself have been here together in Toledo and have worked shoulder to shoulder for many years; and I feel that we all have been benefited by thus associating together. To the younger members I want to say that I feel myself quite old in dentistry; and that I have learned to think that the things we always have had we do not appreciate quite to their fullest value. You young fellows can have no idea of the conditions through which some of us older men have worked and pounded our way.

When we began, the profession was an entirely different proposition from what it is today. The methods of teaching followed in the colleges were very crude. We got very little in college then compared with what now is given. All of these improvements have come about through organization and united effort. The dental organizations, local, state and national, have had far more influence in bringing these things about than have the colleges. What has been done by the colleges has come in response to a demand. First one college would make a little advance; then another would have to follow and, maybe, go the first one a little better, and so on.

I wish to emphasize the fact that it is this organization, with the state and national societies all working together, that has brought about the almost unbelievable advances in our profession and the conditions surrounding the practice of dentistry. If we will use our eyes and look about us, we need not go it blind. We can see things being done every day. Such things only come about by earnest, painstaking interest, and hard work. We older men especially all know that when a meeting was held, Dr. Barber was there every time. No matter how busy, he always found the time to go, while some of the rest of us have shirked. We might prefer to go hunting, but Dr. Barber always went and he always took active part. He did whatever happened to need doing. He always has done well all that his hands found to do—and this great office is merely his reward. He has earned it well. It is not only an honor to him and to us, but to everyone in Toledo. We have all helped each other, and he has helped all of us. He has made good in his profession, and will make good in his new duties. There are no harder workers than Dr. Barber. He has equipped himself for professional duties perhaps as well as any man in the state, and he knows how to use his equipment. I thank you, Dr. Barber, and congratulate you, and hope that we all shall be able to do something to help make your administration a success.

DR. COOK: There is Dr. Eppstein; let's hear from him.

DR. I. A. EPPSTEIN, Toledo: It is the position of some of us to sit back and agree with all of the good things that have been said about Dr. Barber. We have merely to look our appreciation rather than talk about it.

We want the profession to know that we certainly have appreciated our Dr. Barber, and do appreciate him, long before the outside world of dentistry took him up to show him honor through the expression of such appreciation. We knew his value, but did not know how to go about it to herald his greatness, and had to sit back and wait until those other fellows took their votes to show us how. We know that they will realize that they have made no mistake. We know now that they have done the right thing.

DR. COOK: I see Mr. F. G. Crandell, of The Ransom & Randolph Co., in the room. I am sure that he has something to say.

MR. F. G. CRANDELL, Toledo: Mr. Toastmaster, Dr. Barber, Members of the Toledo Dental Society, and Friends: I am very glad to have an opportunity to add my word of appreciation for Dr. Barber. Not being a member of the society, I did not expect to have that privilege. I have expressed myself to him in private, but I am very glad to repeat that expression in this public way. I have known Dr. Barber well during all the years that I have lived in Toledo, having met him shortly after coming here, more years ago than I care to tell. During all of these years I have admired him for his manly, straight-forward ways. He never minces matters. When he has anything to say, he says it, and says it because he means it; and he puts the same conscientious work into the mouths of his patients.

Dr. Barber has stood aloof from many of the fads that have agitated the profession since my acquaintance with it. He has known intuitively that they would not stand the test of time. His prophesies have come true. Many of them have been forgotten, but I am glad to say, Dr. Barber is still with us.

It gives me great pleasure to be with you tonight, and to add my congratulations to those of the rest of you. I am sure that Dr. Barber will fulfill all the duties of his new office acceptably, as he has those of his profession for many years. I thank you.

DR. COOK: Gentlemen, it is growing late. I know we have enjoyed our social evening, particularly all that has been said to and about Dr. Barber—about the honor that has been conferred upon him and about our appreciation of that honor. We are most heartily glad that he is a citizen of Toledo and a member of our local society, and that he has done more than any other one member to make it a good and a useful society. I am now going to introduce to you the new president of the National Dental Association. Gentlemen—Dr. Barber. (Cheers, etc.)

Dr. L. L. Barber, Toledo: Mr. Toastmaster: When I came into this room I did not think that I was very much of a man, but since I have been able to sit here and hear dentist and layman, Jew and Gentile, citizen and dental dealer, stand up and give testimony in my behalf, I am beginning to think that I may be quite a fellow.

I want to say that I very greatly appreciate the honor that has been bestowed upon me. And it was "bestowed" in the true sense of that word. When I went to Louisville, I had no idea of becoming president of the national society. As Dr. Casto has told you, the movement to elect me was started outside of Ohio, and had gained considerable momentum when somebody came and told me about it, and asked me seriously to consider the proposition. My reply was to go to the Ohio delegation and find out how its members stood. If they were for me, all right—go ahead. "If they are not for me, I will not consider the candidacy."

As much as I esteem the honor of being president of our great organization, as much as I appreciate the honor conveyed to me in the words of these visiting friends of mine and ours, still I must say that most of all I esteem the honor that the dentists of Toledo have offered me in being present here tonight.

I do not know of anything that could more greatly honor a man than to have those with whom he has worked day by day bear testimony to his worth and their appreciation of him as you have done on this occasion.

I am in no condition to make a speech, but I want to say that whatever may come to me as part of the duties of my office during the coming year, I pledge myself to do my best to discharge those duties worthily, and as they should be discharged. But no man is large enough to handle those duties unless he has the co-operation of his fellow workers. And I want to take advantage of this opportunity to ask the co-operation of every Toledo dentist, and of every one of our visiting friends, in anything that I may ask you to do.

I know that I cannot appoint you on committees. All that has been changed. Committees for this year were appointed by the retiring officers of last year, and the committees for next year will be appointed by this administration that is, by the Board of Trustees. But whatever you may find to do, gentlemen, I ask you to do heartily, and to the best of your ability.

I want to ask at this time that as many members of the Toledo Dental Society as can make it possible, arrange to attend the meeting next year, during the week of October 22, in New York.

Now, just a word as to some of the activities of the National Dental Association. One is the establishment of our journal on a monthly basis. In January we expect to begin the issue of our journal monthly, and it will be published solely in the interests of the dental profession of the United States, unhampered in any way by connection with any commercial house or association of such interests; and we hope that magazine will be conducted in such a manner that when dentists see in it articles, tests, results of experiments, description of instruments, or anything of that sort, that they will know that those things are of value, and learn to depend upon them.

That sort of thing is, in my opinion, quite impossible in the case of a professional journal published by a commercial house. I say this with all due regard to dental houses. I know that those people are not and cannot be in business for the sake of their health; money is their object. Of course, they are in no position to censor every article, advertisement or whatever it may be; that is no part of their vocation. Dental journals conducted for the dental profession should be in a position to be independent of all commercial influence, so that their readers may come to depend upon them in every way.

I want to say just a word in regard to the research department. There probably is not another man in the dental profession who is able to take up and carry on that work with the vim and vigor that Dr. W. A. Price has displayed. I am afraid that some of us do not fully appreciate the immense benefit that the work of this department is bound to be to every member of the profession. Dr. Price may, at times, become a little too enthusiastic to suit all of us, but that is the only kind of man that could succeed at all in that kind of work. We should have been swamped long ago without that kind of man. Therefore, when the time comes that real, genuine, solid, financial support of that work is necessary, I trust that every one of us will feel it to be a privilege, not merely a duty, to heartily give in that support.

I want to thank the local gentlemen for this splendid banquet, and for all the beautiful things they have said about me. I have heard enough of the other sort, the Lord knows, all of my active life. So long as I live I shall appreciate the honor that has been done me. It seems good to hear a few things that do not grate upon one's sensibilities quite so acutely as some of the other things have done.

I thank you again and again. (Prolonged applause.)

DR. COOK: I want some member of the Toledo Dental Society to move that this basket of flowers be handed to Dr. Barber, to be presented with our good will and best respects to Mrs. Barber. (Moved by many members and seconded and carried unanimously.)

DR. BARBER: Aw! Can't you deliver them?

DR. CANFIELD: I move that we give a rising vote of thanks to the visiting brethren for their part in making this occasion such a complete success. (Everybody up.)

Adjournment.

DINNER IN HONOR OF DR. J. R. CALLAHAN

(*Stenographic Report by Dr. Frank W. Sage.*)

TUESDAY EVENING, June 12th, the Cincinnati Dental Society tendered Dr. Callahan a dinner at the Hotel Gibson, in recognition of honors recently conferred on him for research work. Dr. Callahan had just returned from Rochester, N. Y., where the dental society of that state bestowed on him the Jarvie Gold Medal and Fellowship Honors.

About seventy dentists, including several visitors, sat at table. After coffee and cigars, the chairman, Dr. C. W. Cragg, president of the local society, introduced the first speaker of the evening in a few brief remarks:

DR. CRAGG: We are gathered tonight in honor of one of our members who has just returned from New York, where he was called to receive a medal, known as the Jarvie Medal. The honor is bestowed on him in recognition of attainments in a special line of dental research. We are proud to have Dr. Callahan as our guest of the evening, and to speak our appreciation of his achievements. In honoring him we honor the dental profession. Before committing ourselves too effusively to commendation of a man, it is, however, well to know something of his ancestry. (Laughter.) Dr. Way has looked up our guest's antecedents, and will tell you something of what he has discovered.

DR. T. I. WAY: Mr. Toastmaster, Our Guest and Fellows: Verily, verily I say unto you, he that hath ears to hear, let him hear and harken unto my voice, that he may give heed to those words which may be spoken concerning the things that so greatly interest us, for there is one amongst us that engageth our attention. It is written that James begat Dennis, and Dennis begat John. So it came to pass in the reign of one James (whose surname was Buchannan) that unto Dennis and Sarah a son was born, and whilst this child was mild of manner, verily he was lusty of lung, and did cry aloud for the things which were most pleasant unto him, and for the space of an year and a part thereof, he fain would fill his belly with milk; and his ears were filled with the honeyed words of fond and doting parents, wherefore the child grew and waxed strong, and his mind was keen and did give promise of great attainment. And as he became a lad verily he was found daily aiding and assisting him that did beget him in ministering unto those that were sick and lame and sore afflicted, and when he had arrived at the age of discretion, looking about him, sayeth he unto himself: "I will get me hence from this place, for I will follow not in the footsteps of my father, but verily I will become a mender of molars." So he gathered together the things that were his and journeying toward the East into a strange country, until he came unto a great city—even unto the City of Brotherly Love. And he dwelt there for a space of two years, learning of those things that were needful that he might prepare himself to do those duties which were to come, and he did thrive as one of diligence; and when the time was ended, those that were in authority gave unto him a parchment, and there was

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inscribed thereon a testimony of his attainment, and thereon also was inscribed the year one thousand and eight hundred and seventy and seven; and immediately he departed from that city and came again unto that place wherein he had been as a youthful pest. And there dwelt he for a season, doing those things he should have done and those things he should not have done and without recompense; so that he was constrained to once again depart from the borough amongst the hills and the place has known him no more unto this day.

Wherefore he sayeth, "Surely I will journey unto the farthermost part of the land," and so he did come to dwell in a great city by the sea, even unto the Golden Gate, and there he didst learn many things that were good and of great benefit, but after a season he did long for the land that was dear unto him. And he sayeth, "It is good that I return again unto the land wherein I was a child." So came he unto this place, and verily, verily his lines were cast in pleasant places; for he came to know a good Samaritan, whose surname was Hunter, who, looking on this man, sayeth: "Verily, he looketh good to me; so I will build for us an habitation." So it was done and he was placed over and above the builder, and they did dwell in harmony under one roof for a space of one score and four years.

Now that he was settled in this abode, he sayeth unto himself, "Verily, I shall study and do those things that delight my heart," and for all these years hath he striven for the benefit and advancement of his brethren, going up and down throughout the land, even unto the far East and the far West and the far North and the far South, exhorting his brethren to the better things of our beloved calling. And in this he did make much progress, and the brethren in the Fast sayeth unto each other: "Behold! Of the many who have contributed to the advancement of our cause, there is none more worthy of our preferment than this man of the Middle West." So they met together of one accord in one place, even in the Empire State, and did honor him and did give unto him a token of their appreciation, in this the year one thousand and nine hundred and seven and ten; and of his labors two score.

It has been written, "A prophet is not without honor except in his own country," but I say unto you this day and this hour proveth the exception, by these brethren who have gathered here together to do honor to him who is one of us—John, whose surname is Callahan.

Dr. Cragg: We have with us tonight a gentleman from Northern Ohio, one of our big men, president of the national association. I take pleasure in introducing to you Dr. L. L. Barber, of Toledo.

Dr. L. L. Barber, Toledo: Mr. Chairman and Honored Guests, Members of the Cincinnati Dental Society and Friends: Whenever I attend an affair of this sort, I am reminded of a story. A boy made up his mind to go to the city and cast his lot with people who knew more than country people. Seeing a sign, "Boy Wanted," he entered the place and addressed a floor-walker. After a brief interview, the floor-walker said, "I don't think you would suit us." However, the boy was so persistent that finally he referred him to the superintendent, who likewise gave him little encouragement. Finally the boy, refusing to be put off, he asked, "What can you do better than anybody else can do?" "Well," said the boy, "on the farm we used to get behind the barn sometimes and try to see who could sling a pitchfork full of mud highest. Some of the other boys could sling mud as high as I could, but I could always make it stick higher up than the others could." (Laughter.)

Our friend Callahan has been one of the few who could "make it stick." I have known Dr. Callahan for thirty-one or thirty-two years. When I was a young man, having just entered the State Dental Society, I came after a while to be in line for the office of vice-president, and a large delegation from my town protested against my election. Callahan came to my aid; told them if it was a private, personal quarrel, to go home and fight it out there, not obtrude an outside affair upon the society. He was always for fair play.

This, in my conception, is the highest tribute that can be paid any man—to have fellowship honors and a medal given to one by members of his profession who are working in the same line of scientific research, and to have a dinner given you by fellow members of your profession in your home town. I am glad to be here tonight, and I hope to meet you all at the national meeting next October. I thank you.

Dr. Cragg: We shall be glad to hear next from Dr. Logan.

Dr. W. H. G. Logan, Chicago: When your chairman asked me to speak, I suggested that he leave me until toward the last of the speaking, as I usually find I can do better by borrowing from ideas preceding speakers have advanced. (Laughter.) But he seems to have disregarded my request, so I must get along on my own merits, I suppose.

I have known Dr. Callahan since the year 1897. He has always stood for common-sense things. He has never been back of a proposition that you could not take home with you and use. Whatever he did he always did well. It has been my pleasure to see a number of his patients. Fillings he made years ago are still doing good service. He has actually done the things he has talked about in societies, and that, you know, is not true of some; some indicate operations which should be done thus and thus, yet fail themselves to do them. His life work has been honestly done; his career has been worth while. I accepted an invitation to come here because Dr. Callahan has been a benefit to me. That is the reason I am with you tonight. He has always come to Chicago, whether convenient or not. I owe him this debt of appreciation, and it is a pleasure to come here and pay it. As Dr. Barber has indicated, the medal is a fine tribute—a compliment worthily bestowed on a worthy man.

Some years ago Francis Murphy, a great temperance lecturer, had been lecturing many days and nights in a town, and every saloon and doggery had been closed. A meeting was being held in a theatre, and as he came out to make his final address, a little girl walked up the aisle and before the whole audience, handed him a single flower. Murphy in accepting the simple gift said: "Ladies and gentlemen, I would far rather have this flower presented to me here and now than to have such an offering made after I am dead." I would rather, if I were Dr. Callahan, have this demonstration from people I had lived among, whose patients I have seen, than to go to New York and have them give me a medal. I would rather have this token of friendship and appreciation, than the medal itself.

Ohio has done much for dentistry—you younger men do not know that. Taft, in his day (it will be sixty years next year since the organization of dentistry in the United States), and in those early days prominent dentists of Ohio and Pennsylvania took an advanced position in furthering the progress of dentistry—and Ohio has not backed up at all since you young men came into the profession. And a great part of the load Callahan has carried. (Applause.)

Dr. Cragg: We have with us the chairman of the National Legislative Committee. I take pleasure in introducing to you Dr. Brown, of Columbus, Ohio.

Dr. H. C. Brown, Columbus: Mr. Toastmaster, Members Cincinnati Dental Society, and good Friends: I assure you it is a great pleasure to be here tonight, where the boys of the local society and these visitors from other cities have met with them, to honor Dr. Callahan.

Dr. Logan has said that when he was placed far down on the list of speakers on a dinner program, he could always gather enough from what the others preceding him had said to furnish him ideas, and enable him to make out somehow. (Laughter.) So now I say, part of my speech might as well be credited in advance to Logan. He said numbers of good things about our honored guest of the evening which I might repeat. Tonight, in the room where we were waiting before we came to table, I heard expressions from our various visiting guests as to the worth of this medal Dr. Callahan has won. Dr. Callahan said it particularly pleased him to be able to bring this testimonial to his own state, Ohio. As a member of the profession in Ohio, I wish to express my appreciation of the sentiment.

It was my pleasure to hear from Dr. Gallie, of Chicago, who wrote to me after his return from our meeting in Columbus, expressing his gratification and his appreciation of various courtesies which had been shown him. He had been handed out some things which "stuck" with him. We had a real meeting in Columbus, as we usually have, and Gallie was so impressed that his words were such as it is a pleasure to repeat.

I remember back a number of years, when as a country boy I journeyed to Cincinnati to learn dentistry. The dental college was then on College street, not far from the old Atlantic Garden, a famous drinking resort. Some of you men around this table tonight were there as students at that time. There are others, graduates of that day, scattered throughout the country, and most of then are "making good." I recall distinctly hearing of a gentleman named Callahan. At that time I did not assume the privilege of familiarly referring to him as Callahan. In later years I became associated with him and tried to look up his ancestry, to see if his father was not a famous practicing dentist, along about 1888 or 1890. It had not occurred to me that the identical Callahan could come thus to be associated with me, years afterward.

I think we occupy a viewpoint, later in life, which makes it impossible to recognize the difference of years; that we gauge our determining points of view when we are younger. It has been interesting to watch Dr. Callahan's career; he always gets back to the root-canal problem, finally. Whenever you meet him in away-from-home cities, you are fairly certain to find him surrounded by a bunch of young men inquiring how he does this and how that operation, and he is always explaining the technic of this or of that operation.

I want to thank the members of this society for contributing this "bouquet" to Callahan while he is still with us. I agree with the sentiment expressed, that flowers presented while we are still alive are most appropriately bestowed. I thank you.

Dr. Henry Germann at this point read a number of telegrams and letters.

DR. CRAGG: Dr. MacMillan has been intimately associated in the hospital with Dr. Callahan. We would like to hear from him.

DR. HUGH W. MACMILLAN: Mr. Toastmaster, Members of the Cincinnati Dental Society, and Guests: It is of particular interest to a young man in the profession of dentistry to find out the underlying elements that constitute Dr. Callahan's success in his profession. I have been closely associated with Dr. Callahan the past three years, and have often observed several traits which have earned him pre-eminence. The leading exponent of this success is his remarkable industry. At the hospital he is always the first there and the last one to leave. He is frequently in his office or at the hospital at seven in the morning. Dr. Callahan, since I have first known him, has never taken a vacation and plans to do his hardest studying during the hot summer months. Last summer he took the dentist's place at the Cincinnati Tuberculosis Sanatorium in order to find out for himself the dental conditions among that class of patients. His perseverance is remarkable. The dogged persistence with which he has accomplished his work in root-canal preparation and treatment attest to this statement.

When we observe the general failure of most dentists to spend time studying and reading professional magazines, it is with the greatest admiration that we can turn to Dr. Callahan and know that here we have one of the greatest readers and thinkers. It has been my privilege to see many of his books and I have been strongly impressed with the number of sentences that are underlined and the number of notations which fill the margins. It is also his custom to carry a note book and write down whatever interests him, though it be a scientific problem or a funny story.

In a recent address before the graduating class of the Ohio College of Dental Surgery, Dr. Hoff said that it seemed that there were more giants in the dental profession of years ago. He also added that perhaps this was more conspicuous because there are so many giants in the present day. Personally, I think the reason for Dr. Hoff's remark is because he himself is now a giant and sees with a different perspective, but be that as it may, we have with us tonight a man who is a giant among giants. It is a wonderful privilege to know in the years to come that we will have the friendship, the guidance, the inspiration which Dr. Callahan so freely gives.

Dr. Cragg: We have with us now a modern giant, with whom we shall feel proud to tell in years to come we have had association, Dr. Mills, of Chillicothe, Ohio.

Dr. C. W. Mills: Mr. President, Gentlemen of the Cincinnati Dental Society: I came here by invitation because I love Callahan. All the members of our Rehwinkel Society love him. Our society was organized, I think, seven years ago, and we have always depended on Callahan's taking part in our programs. He has missed only one meeting in those years. Young men coming to our meetings would make a first inquiry, "Is Callahan here?" And when he happened once to be absent, they were disappointed.

Dr. Callahan, Dr. Barber, and others I might name, have been much to me. This banquet is in a particular sense a token of affection, for all have loved Callahan. (Applause.) In the early days when I visited Cincinnati, I used to run around seeing the girl acquaintances of my student days; now I go to see Callahan. If he was not in—well, then possibly I would hunt up the girls.

On behalf of the Rehwinkel Society I want to extend our assurance of appreciation of the good he has done us, and the help he has extended us.

In introducing Dr. Frank Hunter, the chairman told of a patron of Dr. Callahan's coming into his office with a bill he had received, and saying: "When I scanned this, and noted your charges, my blood boiled" Thereupon Callahan retorted, "In that case I shall have to add twenty dollars to my bill for sterilizing your blood."

Dr. Frank Hunter: Mr. President and Gentlemen—I prefer to call you gentlemen— (Laughter). I presume it has been my pleasure and honor to have known Callahan longer than any other man in this room. I first became acquainted with him in the old Mississippi Valley Dental Association, in his early days. By-the-by, that association contained a number of men who have made their mark in the profession: McKellops, Rehwinkel, Watt, Taft, Taylor, H. A. Smith and numbers of others I do not recall by name, bright lights in the association. It was there that I met Callahan for the first time. We became acquainted, but not intimately, at that time, for he was somewhat of a rover in his early days. He finally settled down in Hillsboro, Ohio, coming later to practice in Cincinnati. From that date we became more intimate, but two other local men were for a time more closely intimate with him than I was, Drs. Heise and Fletcher, both gone now. These three were students and they met around at each others' houses to study bacteriology. Sometimes they would meet at the old Atlantic Garden, Fletcher, however, being undependable, he not being a drinking man. (Laughter.) This practice they kept up for a number of years.

In the year 1892 we two became closely associated, having offices in one building. Then I joined the others in their studies. During our long association I had opportunity to note the studious application of Callahan. Dr. MacMillan has spoken of that, and of his energy and zeal. At one time it seemed as if he would break down. I myself thought at one time he might not live long, he worked so hard. But he was tough and withstood it all, and today you may see what he is.

I am able to emphasize everything that has been said here tonight in regard to his work and his reputation. But as we are all one family here, on this occasion, I want to let you into a secret: Callahan is a damn fool. (Great laughter.) You may say that is no secret; I think he knows it himself. During our long association he was one of the crudest students I ever knew. I labored and labored *and* labored with him, to get something into his head, being discouraged until, seeing a slight glimmer, I renewed my efforts—with the results you see tonight. (Renewed laughter.) Shows what perseverance will accomplish. Whatever he has accomplished, whatever reputation he has gained, I want you to understand the real credit belongs to me. (Prolonged applause and laughter.)

Dr. W. E. Lewis, Dayton: Mr. President and Gentlemen: When I received your invitation to come here and participate in the congratulations to be extended Dr. Callahan, as the recipient of the Jarvie medal and fellowship honors, I could not quite get at the significance of the latter, the "good fellowship" part. Everything complimentary has been said here about Callahan, excepting that the "good fellowship" part has not been emphasized. All you have said of a personal nature has referred to his being old, and that has saddened me a trifle. I have patients leaving older dentists, coming to me, and sometimes they will say, "I have decided to come to you; I have always been a patient of Dr. So-and-So, but he is growing old, and I thought I would make a change." It comes over me that that must in due time become the experience of each and every practicing dentist.

But as to "good fellowship," it occurs to me as improbable that Dr. Callahan would have received these honors had he not been esteemed a good fellow. That he is such, all of us can testify. He is at all events, the youngest old man I ever knew. I disapprove of referring to him as an old man, certainly.

Keeping sweet in dental practice is something to be cultivated. We have our problems to solve, and we meet personalities calculated to sour us, but we must keep ourselves sweet. Callahan never gets discouraged; he always appears smiling.

Why should not Dr. Callahan receive this medal? Of all the branches of research work, to us dentists filling root-canals is one of the most important.

The consequences of improper treatment and filling of roots may not be manifested for years, yet in the end they do appear. To learn the best that is to be learned about a matter so important is well worth such sacrifices of time, study, labor, as Dr. Callahan has given this subject.

Dr. L. E. Custer, Dayton: Mr. Chairman, Guests and Friends: When I came into this hall it was with an understanding between the presiding officer and myself that I was not to be called on to speak. But since it is insisted that I say something, I will refer in a few words to the companionable nature of our honored guest of the evening, Dr. Callahan.

In 1893 I was one of several who took a bicycle trip to Toledo with a party, of which Callahan was one. I will say, if you want to find out what a man really is, plan to go on a bicycle trip with him. Many amusing incidents enlivened that occasion. Callahan contributed his full share of the entertaining.

But why this conferring of a medal and fellowship honors on him at this time? Why this meeting together to honor him? The achievement which probably most impresses us is his improved methods of root-canal treatment and filling. Away back in 1895 he laid the foundation for this finally completed method. He has come nearer to a practical, satisfactory solution of the various questions involved in this matter than any who preceded him in pathological research along this particular line. It is eminently appropriate that he should be thus honored.

Dr. F. W. Sage: I cannot let this occasion pass without a few words. Sometime in the early nineties, Dr. Callahan came into my office to buy my practice. He had heard I intended going to the far West to engage in raising sheep. But a visit to the region and an interview with the parties who wanted to have me make a fortune, convinced me I had better continue to pile up wealth at dentistry. So I had to disappoint Callahan. He, however, soon after that came to Cincinnati and took the office of Dr. C. R. Taft, lately deceased.

I want to say I believe in all sincerity that his method of root-filling is far superior to any method we dentists have used. Reference to the old Mississippi Valley Dental Association has been made. It was at a meeting of that association here in the eighties that Dr. H. J. McKellops, of St. Louis, a man of national and international reputation, introduced chlora-percha, for filling roots. That, at least, is the first I ever heard of it. Dr. McKellops was a man of strong convictions, a man thoroughly sincere, and a hater of sham and pretense. Dr. Logan spoke of men who make claims in conventions they cannot verify. I remember that at the International Dental Convention held in Chicago in 1893, in the World's Fair grounds, in one section of the convention, Dr. Abbott, of New York City, declared himself able to fill all three roots of any upper molar with gold, clear to the apex. Dr. McKellops at once sprang to his feet, challenging the statement. He said in substance: "I have never been certain that I could fill with gold even the palatine root of an upper molar, clear to the apex. Now, I do not say that Dr. Abbott has misrepresented facts, but if he has done all that, he has done more than ever I could do with the most painstaking efforts. I confess I often find it impossible so much as to enter even part way some upper molar roots. Now, in a few days I am going to New York for a few weeks, and I propose to stay right in Dr. Abbott's office until he demonstrates to my satisfaction that he does just this he claims. And if he doesn't do it, I am going to expose him to the profession."

But many of us have long known that chlora-percha was not all it should be as a root filler. Most of you must have noticed, when excising, say an incisor root for crowning, you find the root filled solidly enough with gutta percha, you notice it is odorous—as the little boy said, there is an "odor of stink" about it. I used to think this was wholly external, caused by decomposing saliva seaking into the outer exposed portion of the filling. But thorough investigation convinced me the whole filling, to the very apex, was contaminated with mephitic gases absorbed from the apical region. Recently I found this confirmed in a statement that gutta-percha root fillings are capable of absorbing these gases.

Some reference has been made to Callahan as a story teller; which reminds me that at Dayton, at the state society meeting last December, entering the lobby of the Miami Hotel with a Cleveland friend, he said to me, casually, "I understand Callahan is going into business, going to quit dentistry; perhaps it is only that he has taken up a side line to carry along with dentistry; I am not sure."

"Oh, no," I answered, "I don't believe that. What is it he is supposed to have taken up?"

"Something in the line of woolen goods, knitting stuff, and all that," said he.

Just then we noticed a throng of fellows craning their necks and pricking their ears, eager to hear what some man in their midst was saying. Presently we discovered the central figure was Callahan.

"There he is at it, this minute," said my companion. "Don't you see how earnest he is, and how tickled the fellows all seem?"

"Of course," I replied, "but what has all that, their being tickled and his earnestness, to do with woolen goods, knitting, and so on?"

"Why just this," said he; "Cally is handing out a line of his fancy yarns."

I might talk along half an hour or so, but the hour is late and so I will cut off the flow. I congratulate Dr. Callahan on the distinguished honors he has won; I thank him for the honor reflected on our local society; on behalf of the dental profession at large, I thank him, if I may assume that privilege.

DR. CALLAHAN (closing): Mr. President, Boys and Guests: I do not like to call you doctors; you out-of-town men will understand we Cincinnati members of the local profession are a crowd of boys together. We have social informalities, when nobody is around from outside, to criticise us.

I have faced a good many audiences within recent years, some large, some small. I cannot explain why it is so, but here in my own state, among familiar acquaintances of the profession here in Cincinnati, among those most intimately known to me and where I am more intimately known, I find it more embarrassing to stand up and express myself than I do among comparative strangers.

I had not anticipated that this would be quite the occasion it has turned out to be. All these distinguished guests, this long list of congratulatory telegrams, these letters of regret and congratulation, have most unaccountably overwhelmed me. I really feel quite unequal to the attempt to say the things I assume are expected of me. I feel at a disadvantage, but I will try to meet the occasion.

I wonder if it would be of interest to you to hear something about some of the meetings in another state, say the one I recently returned from in New York state? They are all pretty much alike, these meetings—I turn to Dr. Logan because he has been in attendance at meetings in fourteen cities recently, and he may confirm what I say.

At the meeting in Rochester, N. Y., recently, when they conferred on me this medal, Dr. Jarvie set aside a fund for the purpose of supplying through accruing interest, money to be devoted to payment for a gold medal, which medal was at stated intervals to be conferred on any member of the profession thought worthy of special honor and distinction, because of merit of attainments in some approved line of original research or discovery. It was appointed to the state dental society to appoint a committee, whose duty it was to decide who the recipient should be, and to confer on him the fellowship honors and the medal.

Personally, I know little about it. I do remember it was this medal which was conferred on Dr. W. D. Miller. But that had passed out of my mind, because I never associated myself with that honor, until I received word that the committee had decided to award the same to me. When I presented myself to receive it, the ceremony was conducted with only enough formality to lend proper dignity to the occasion. At the dinner, five hundred covers were laid. They had written me to send on a sketch of papers I had written, and a photograph, which I did. The president of their society read a short address. Some fellow here in Cincinnati had added a few items on chickens. (Laughter.) On all occasions I have been called upon to preside, I have resolved not to take myself too damn seriously. I have written, for self-application, a thirteenth commandment: There are others who have done things.

I am glad the medal came to our city of Cincinnati; I am trying to make up my mind what to do with it. (Hunter, interrupting: "Give it to me.") (Laughter.) I know Hunter would take care of it. I have several matters to provide for before I pass away. You remember when you presented me with an X-ray outfit, I gave it to the National Research organization.

Dr. Hunter spoke of the meeting of the old Mississippi Valley Association. My first encouragement to undertake research work came from Dr. Atkinson, of New York, who was present at one of the meetings of that society, many years ago, when I was starting in practice. I read on that occasion the first paper I ever had prepared. When I got through reading I was nervous and excited; I wished the floor would open and let me drop through. Dr. Atkinson whispered to me: "My boy, you read very well; you keep on writing papers and some day you will write something worth while." (Laughter.)

Now, I fully appreciate the honor of having had this medal and fellowship honors conferred on me, quite as fully do I appreciate the kindly sentiments and the evidences of good-fellowship I have this evening observed on the part of my friends from distant cities, as well as from my long-time friends here at home. I thank you. (Applause.)

(Meeting adjourned.)

Troops for Europe

General Wood was in Memphis, Tenn., on June 29, when he was interviewed as to the time of sending additional troops to Europe. A special dispatch to the *New York Times* says:

"The regiments from the southern states and the other units now being formed under the jurisdiction of the Department of the South, will go to the front in France between the first and middle of November," said General Wood when asked when he thought the Tennessee soldiers would leave for France. He added:

"Those troops that are in training camps now will be ready to embark for France in November. When these troops land in France and take their places in the trenches, believe me, the Kaiser will know we intend to do our damndest."

General Wood is enthusiastic over the re-entry of Russia in the war.

ORAL SURGERY
CASE REPORTS

CONDUCTED BY HUGH W. MACMILLAN, D. D. S., CINCINNATI, OHIO
THIS DEPARTMENT AIMS TO REPORT INTERESTING ORAL SURGERY CASES IN BRIEF FORM, ILLUSTRATED BY RADIOGRAPHS AND PHOTOGRAPHS WHERE POSSIBLE. ARTICLES FOR THIS DEPARTMENT MUST NOT BE MORE THAN 500 WORDS IN LENGTH. SEND CONTRIBUTIONS TO DR. HUGH W. MACMILLAN, UNION CENTRAL BUILDING, CINCINNATI, OHIO.

THE INCREASING NUMBER of neuralgias of the trigeminal nerve invite an investigation into the causes which may produce these reflex pains. An irritation to any branch of the trigeminal nerve may cause obscure pains in any other branch of the same nerve and, at times, in distant parts not supplied by that nerve.

Pressure upon a nerve has long been known to cause local and reflex pains. The anatomical position of the lower third molar peculiarly predisposes this area to give rise to reflex disturbances often serious in their consequences. If this tooth becomes impacted the pressure upon the second molar may cause the pain, or the direct pressure upon the inferior dental nerve by the tumor-like formation of the cementum (hypercementosis) may give rise to obscure pains particularly in the region of the ear.

A very interesting pathological condition has been found by the writer to be associated with trigeminal disturbances. A small nodule of bone has been found in two cases attached to the roof of the inferior dental canal apparently causing pressure on the inferior dental nerve. This osseous tumor may have been formed by pericemental cells left following extraction. The operation required to remove them is comparatively simple, but great difficulty is experienced in localizing these areas due to the angles of the radiograms. When removed they resemble small cherry stones in form and texture.

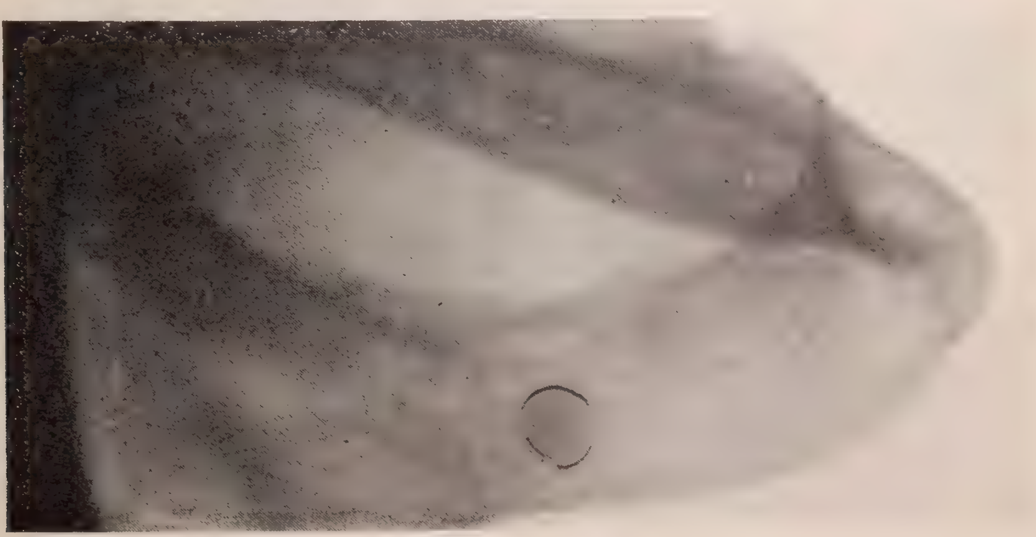
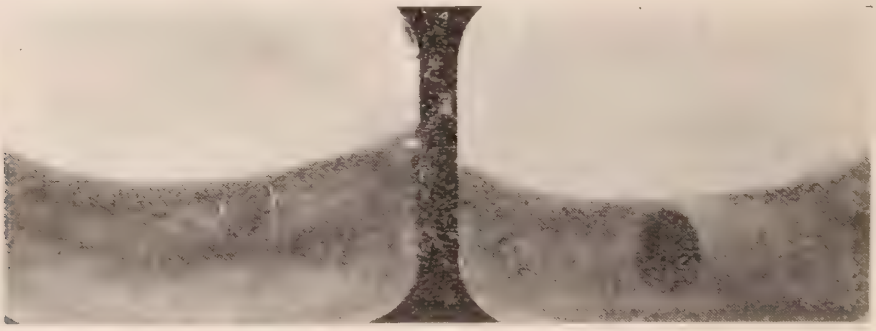


Fig. 1 Case I

Case I, Fig. 1, Mrs. W., aged 57, referred by Dr. Frank P. Hamilton, had been suffering with severe pains in the side of her face for eight years.

The pains were of such intensity that she could not open her mouth or move her tongue when the paroxysm was on. The pain was characterized as a "sharp, quick, pulling pain as though the side was being cut to pieces." The pain seemed to start from the mental foramen and radiated to the tongue and upper jaw. The duration of the pain was from fifteen minutes to half and hour and it would recur six or eight times a day.

Radiograms showed an area of density lying over the inferior dental canal. After two attempts, this was removed and was found to be of the consistency of hypercementosis. In size it resembled a small pea. As the wound healed, the pains gradually diminished and finally disappeared entirely.



Figs. 2 and 3. Case II

Case II, Figs. 2 and 3, Mrs. S., aged 66, referred by Dr. J. C. Oliver, had been suffering with neuralgia on the left side of her face during a period of three years. During the last year the pain was constant. The left side of the face was hyperæsthetic to such a degree that she could not touch it. Radiograms were taken and an area of eburnated bone was found over the inferior dental canal. This was removed under conductive anesthesia. To be sure that the area was all removed a lead shot was placed in the wound and another radiogram was taken. If the area were still present the shot would aid in its localization. As the shot occupied the same location as the area did formerly, it proved conclusively that the bone had been removed. The nodule removed had the same appearance as described in Case I, except that it was smaller in size. As a result of the operation the pain and hyperæsthesia disappeared in the inferior dental branch but persisted in a slight degree in the two upper branches. Dr. Walter E. Murphy found a purulent ethmoiditis and a deflected septum on that side which he corrected. On the last report the patient was comparatively free from pain and the hyperæsthesia had not reappeared.

The importance of peripheral irritation in the etiology of trifacial neuralgias is being recognized more and more. Pressure is one of the greatest causes of nerve disturbances, and it finds a field peculiarly adapted for its employment in the jaw. The constant irritation effected by these peripheral lesions undoubtedly results in a great percentage of the causes of tic douloureux.

Cases reported by Hugh W. MacMillan.

EDITORIAL

HONORING FRIENDS

It gives us pleasure to tell our readers, in this issue of The Summary, about the testimonial banquets given two of our prominent dentists, Dr. L. L. Barber, of Toledo, Ohio, and Dr. J. R. Callahan, Cincinnati, O.

Two royal good fellows whom it is a pleasure to know. Men who are making dentistry better through their earnest efforts in the profession. Men whom we all love to honor. If you are not personally acquainted with them, read what their admiring friends had to say about them when gathered around the festive board.

What greater honor can come to a man than that of having his fellow men call him among them to express their love and esteem for him? It comes as a lasting benediction, never to be forgotten. And how much better to honor the man himself than to honor his memory after he has passed away.

We should have more of these testimonial gatherings. There are hundreds of men in the dental profession who are worthy of such recognition.

The jealousy and hatred that have existed in the past among members of the profession is passing away. We are growing in knowledge and strength. We see the folly of a selfish, sordid, single existence. Great progress comes only through a united effort. Help your neighbor to solve some of his perplexing problems and every time you will be benefited yourself. Petty jealousies have no place among members of the profession. They only tend to retard progress and we are glad to see this feeling turning to respect and good fellowship.

This is as it should be. The dental profession has intricate and vital problems to solve, and it is going to require the united efforts of its members to solve them. These men must be united in purpose and feeling to accomplish that which is desired.

The Abou Ben Adhem spirit of "love for his fellow men" should be instilled into every mind and practiced by every dentist. Were this so, our progress would be greater and our accomplishments more complete. Let us adopt as a motto, "Brotherly Love and Esteem." It will make our burdens lighter, our lives happier, and we will have more of these little "get together" meetings that mean so much to those whom we delight to honor.

WILLIAM HARPER OWEN McGEHEE, M.D., D.D.S.

DR. McGEHEE HONORED

Dr. W. H. O. McGehee, for the past eight years superintendent and professor of operative and prosthetic dentistry in the Ohio College of Dental Surgery, has resigned to accept an advanced professorship in the reorganized dental department of Western Reserve University.

Dr. McGehee was born in Virginia. He graduated in medicine and dentistry from the University College of Medicine at Richmond. He was dean of the dental department of the same school before coming to Cincinnati.

The high esteem with which he was held by his associate professors and students in Cincinnati is evidenced by the beautiful farewell gifts which he received. The faculty, at a dinner given in his honor at the Business Men's Club, presented him with a silver loving cup The senior class gave him a gold watch, the junior class a chain, and the freshmen a thirty-second degree Masonic charm. The Xi Psi fraternity presented him with a silver coffee service.

Dr. McGehee has occupied a prominent place in the Cincinnati Dental Society and in civic circles. It is with extreme regret that his Cincinnati friends see him depart.

THE NEW WESTERN RESERVE COLLEGE

Our readers will be pleased to learn that the Western Reserve Dental School, at Cleveland, has been reorganized and is now an integral part of the Western Reserve University.

The new faculty announced is as follows:

PROFESSORS

Frank Monroe Casto, Ph.G., M.D., D.D.S., dean, professor of orthodontia.

Carl August Hamann, M.D., F.A.C.S., professor of oral surgery.

William Harper Owen McGehee, D.D.S., M.D., professor of operative dentistry and pathology.

John James Rickard Macleod, M.B., Ch.B., D.P.H., professor of physiology.

Roger Griswold Perkins, A.B., M.D., professor of bacteriology.

Thomas Wingate Todd, M.B., Ch.B., F.R.C.S., professor of anatomy.

Frederick Clayton Waite, A.M., Ph.D., professor of histology.

George Henry Wilson, D.D.S., professor of prosthesis and metallurgy.

ASSISTANT PROFESSORS

Joseph Patrick Henahan, D.D.S., assistant professor of exodontia, anesthesia and radiography; secretary of the faculty.

J. Herbert Hood, D.D.S., assistant professor of oral prophylaxis and peridontology (and some executive work.)

Lawrence Alfred Krejci, D.D.S., assistant professor of orthodontia.

Vernon Cecil Rowland, A.M., M.D., assistant professor of general pathology.

David Este Sheehan, D.D.S., assistant professor of prosthesis and metallurgy.

Cecil Orville Witter, B.S., M.D., assistant professor of general materia medica and therapeutics.

INSTRUCTORS

Walter James Graham, A.M., instructor in English.

Gaius Elijah Harmon, instructor in bacteriology.

William Charles Stillson, D.D.S., instructor in histology.

Winthrop Ramsdell Scott, B.S., instructor in drawing.

LECTURERS

Samuel William Allen, D.D.S., lecturer on dental ceramics

Clarence Millard Finfrock, A.M., LL.B., lecturer on dental jurisprudence.

Guy Dudley Lovett, A.B., D.D.S., lecturer on clinical materia medica and therapeutics.

Carl Lenze McDonald, M.D., lecturer on rhinology.

Frank Lyman Olds, D.D.S., lecturer on crown and bridge work.

Edward Lacey Pettibone, D.D.S., lecturer on dental economics and ethics.

President Thwing also announced that the dental school will occupy in September the new three-story building now being completed at a cost of $160,000. The dental school building is situated on the campus at University circle. It formerly was located down town.

SOCIETY·ANNOUNCEMENTS

PREPAREDNESS LEAGUE OF AMERICAN DENTISTS

BY J. W. BEACH, BUFFALO, N. Y.

The Preparedness League of American Dentists has become the medium through which the dental profession at large is carrying on the work of preparation for the great service that is ahead of it. For a year and a half this organization has been putting forth every effort to awaken our profession to the realization of the situation and had it not been for the unceasing labor of the organizers of the league, surely we would have found ourselves in a deplorable state of unpreparedness when the stirring message that "war is upon us" was sounded from coast to coast.

The league has nearly 6000 active members and more than 125 sectional units in active operation. Study courses are planned for these units and several lectures with slides are furnished free of charge. This has proven a most effective means of preparing hundreds of our members for the entrance examinations to the Officers' Reserve Corps, Dental Section. We are gratified to report satisfactory progress in securing a splended dental reserve for our government, and we predict the establishment of the most efficient service in this important department of any nation.

Caring for the mouths of applicants for enlistment who are unable to pay for dental service is a most important object of the league and we wish to take this opportunity to thank our members for the unparalleled response this phase of our work has received. We are proud of our profession and when the final reckoning shall come, it will be shown that we have saved for our country many thousands of fighters. The league has been designated the official medium for prosecuting this work and members are requested to report to our headquarters all cases thus cared for, so that we may compile statistics to present to the Surgeon General. The government appreciates what we are doing and we believe our efforts will not go unrewarded when future favorable legislation may be desired by us.

We hope to bring many new members into the National Dental Association through the league, and would call the attention of the officers of our units to this matter. We should bring many into the national before the annual meeting in October next.

The second annual meeting of the league will be held in conjunction with the N. D. A. on October 23rd, 1917, in Concert Hall, Hotel Astor, New York. We are planning a splendid program and will be able to report wonderful results from the different units. Several dental ambulances for use in France are being supplied by our units, and other equally patriotic movements are under way.

We urge the formation of units more generally in order to promote the various objects of the league. Organization is essential and we would point out that *now* is the time our best efforts are demanded, as the league is organized as a war measure; therefore we invite correspondence with this object in view. Headquarters are at 131 Allen Street, Buffalo, N. Y.

Alumni Association of the Xi Psi Phi

The alumni of the Xi Psi Phi fraternity will hold a dinner at the Waldorf Astoria Hotel on October 22nd, 1917.

All the alumni of the fraternity are most cordially invited to attend. For particulars, write Dr. J. Norbert Gelson, 282 Park Place, Brooklyn, N. Y.

American Society of Orthodontists

The 1917 meeting of the American Society of Orthodontists will be held at Excelsior Springs, Mo., September 5-8,

F. M. Casto,
Sec'y-Treas.,
Cleveland, Ohio.

Northeastern Dental Association

The twenty-third annual meeting of the Northeastern Dental Association will be held at the Hotel Bancroft, Worcester, Mass., on September 26th, 27th, 28th, 1917.

Alvin A. Hunt, *Sec'y.*

Southeastern Ohio

This component held a meeting at the Y. M. C. A. building, Marietta, Thursday afternoon, June 21st, President H. B. Hune, of Caldwell, presiding. Talks and clinics were given by Drs. Stewart Brown, of Cleveland, H. M. Semans, P. B. Clark and E. C. Mills, of Columbus. Dr. D. W. Rankin, of Cambridge, representing the Muskingum-Coshocton-Guernsey Counties Society. A resolution was passed providing for two meetings each year, the second Thursday of May and October, the latter being the annual meeting.

Officers elected were as follows: President, J. Nicholas Smith, Marietta; vice-presidents for their respective counties, C. V. Dye, J. V. Maury, C. S. Dye and F. C. Reisling; recording secretary, F. E. McKim, Marietta; corresponding secretary, G. W. Harness; treasurer, C. A. Ward, both of Marietta. In the evening a banquet was held at Hotel Wakefield, after which a unit of the Preparedness League of American Dentists was organized, to be known by the name of the society, and having the respective president and secretary as officers. About twenty dentists attended the meeting.

PROPOSED LEGISLATION TO GIVE THE ARMY DENTAL CORPS EQUAL STANDING WITH THE MEDICAL

AMENDMENT

The amendment, proposed by Mr. Lodge, to the bill (H. R. 4897) to amend section ten of the national defense Act approved June 3rd, 1916, and for other purposes, is as follows:

"Hereafter the Dental Corps shall consist of commissioned officers of the same grades and proportionally distributed among such grades as are now or may hereafter be provided by law for the Medical Corps, who shall have the rank, pay and allowances of the officers of corresponding grades in the Medical Corps, including the right to retirement as in the case of other officers, and there shall be one dental officer for every one thousand of the total strength of the Regular Army, authorized from time to time by law:

"*Provided*, That all laws relating to the examination of officers of the Medical Corps for promotion shall be applicable to officers of the Dental Corps;

"*Provided further*, That Dental Examining and Review Boards shall consist of one officer of the Medical Corps and two officers of the Dental Corps;

"*And provided further*, That immediately following the approval of this act all Dental Surgeons then in active service shall be recommissioned in the Dental Corps in the grades herein authorized in the order of their seniority and without loss of relative rank in the Army;

"*And provided further*, That First Lieutenants in the Medical Department shall be promoted to the grade of captain upon the completion of three years' service in that grade in the Medical Department and upon passing the examinations prescribed by the president for promotion."

In order that the connection between the Lodge Amendment and H. R. 4897 may be fully understood, the latter is herewith incorporated: "*Provided*, That during the existing emergency Lieutenants in the Medical Corps of the Regular Army and of the National Guard shall be eligible to promotion as captain upon such examination as may be prescribed by the Secretary of War."

The proposed amendment is to give to the dental profession the same status as the medical. Ohio has already contributed over 200 members of the dental profession to the Dental Sectio of the Officers' Reserve Corps, and by giving equality with the medical profession it will open three grades to the Reserve Corps men the same as the medical men, i.e., lieutenants, captains and majors. As the present law now stands only one grade is available for the Reserve Corps men of the dental profession, that of first lieutenant. It is obviously unjust to expect men who have been in practice for some years to go in on the same basis as the men who have just graduated. Many of the dental schools have given their professors and demonstrators to the dental Reserve Corps, and these men have to go in on the same basis as the student graduated this year, and if the student receives his commission first, will rank his instructors.

The Lodge Amendment will correct this injustice to a professional class of men who are the only ones now discriminated against, and especially will this apply to the large number of dentists who will have to leave lucrative practices to serve their country during this war, and certainly their patriotism is deserving of the same consideration and treatment as other professions and branches of the U. S. army, as their services, as long as they are considered essential to the health of the soldiers, are as proportionately as important as any other branch or arm of the service.

This proposed amendment is now before the Senate Military Affairs Committee.

Regarding this bill, Dr. H. C. Brown, chairman Legislative Committee, N. D. A., Hartman Building, Columbus, Ohio, says:

"Now is the time to pull together, and as chairman of the Legislative Committee, I will appreciate it if those replies which are either strongly favorable or unfavorable to this legislation will be forwarded to me.

"The needs of the war will call many of our members into the Reserve Corps, and you are undoubtedly interested in doing your part both in rendering service and co-operating in promoting this legislation. In order for this co-operation to be effective, prompt action will be necessary.

"You can very positively assist in this legislation by writing immediately, or more preferably using Night Letter Telegrams, to your senators respectfully soliciting their support of the Lodge Amendment to House Bill 4897, and request them to see Senator Chamberlain and other members of his Committee in behalf of the Lodge Amendment. You can very properly emphasize the fact that the European War has clearly demonstrated the importance of the cooperation of the medical and dental profession in treating many of the wounds resulting from present-day warfare, and that there is no reason why our representatives in the federal service should not be accorded the same status as the members of the Medical Corps.

"The following is a list of the Senate Committee on Military Affairs, and if your senator is on this committee you are in a position to render most valuable assistance:

SENATE COMMITTEE ON MILITARY AFFAIRS

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Gilbert M. Hitchcock, of Nebraska.
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Harry S. New, of Indiana.
Joseph S. Frelinghuysen, of New Jersey.

We urge all of our readers to render as much assistance as they can in this matter, because it is of vital importance to the dental profession. Do your "bit" by urging your congressman to support the measure, and do it without delay.

It is high time some general action was taken to stop the ruthless sacrifice of teeth because of the unfavorable diagnosis of some physician who is inexperienced in such matters. Some M.D. will fail to find the cause of systemic disorders in the field which belongs to him and immediately resorts to the X-ray and advises the immediate extraction of perfectly savable teeth because he imagines he sees something he does not understand. Many, in fact the majority of times he does not consult with a dentist, but promulgates his orders entirely on his own initiative. When a patient appears before his dentist with this kind of an order from a physician, it makes it doubly difficult to show the patient what is the true condition of his mouth from the dentist's standpoint. And if dentistry is of any value at all, it is worthy of just consideration. Not all, by any means, of the disorders of obscure origin are to be laid to the teeth, and by no means all teeth that cast obscure shadows on the radiograph negative can be charged to the abscesses. It is a piece of rank presumption on the part of the physician to assume such to be the case.—*Editorial, Western Dental Journal.*

ALCOHOL'S PART IN THE WAR

SHALL WE LOSE WITH LIQUOR OR WIN WITHOUT?

BY ALLEN ROGERS, PH. D.
AMERICAN CHEMICAL SOCIETY

Alcoholic beverages must go.

The requirement is clear. Alcohol can fill liquor glasses to satisfy the wilful appetite of thousands of Americans living comfortably at home,—or it can be transferred to fill a hundred hospital needs to save the lives and relieve the sufferings of other thousands on the battlefields.

Alcohol must serve the thousands of industrial purposes that are the vital needs of America at war. And in war time, everything must go that hampers the work of a successful mobilization of the country's resources, and leads to final victory.

Every extravagance and waste in home life and public life must be eliminated, and the great industry of alcoholic beverage manufacture must bow before the demands of the nation in its time of crisis. This is no sentimental demand,—nor religious, nor even moral,—it is the demand of the nation's chemists, based upon scientific analysis.

No man would assume that we should curb our supply of ether in order to increase our supply of beverages, and no man will say that our soldiers should be denied the greatest possible protection because the manufacture of their medicines depends upon the reduction of our alcoholic drinks. As a local anesthetic, as a heart and respiration stimulant, and for many other purposes ether, so largely made of alcohol, finds wide use on the battlefield.

Ether may be used in connection with kerosene to produce a very satisfactory substitute for gasoline in motor cars. It may be employed as a solvent, as a cleaning solution for guns, and for many other important purposes. Its use as such, on a large scale, is impossible now because, while denatured alcohol is free, pure alcohol, used in the manufacture of ether, costs $2.40 a gallon, of which $2.00 is tax. European countries have removed this tax, and ether is now made in quantities,—Europe's plan has been successful. It was forced upon her by dire necessity. Let us learn by her experience.

Alcohol is of fundamental necessity as a solvent in the manufacture of explosives. We must be sure that the present abnormal demand is not hampered even remotely.

As fuel, alcohol finds a great use, and fuel will be in unnatural demand as the war goes on. For internal combustion engines, for cooking stoves, and for numerous other purposes, alcohol, as a fuel, must help win the war. Emergencies will arise, and shortages in other fuels will appear suddenly. There must be no curtailment of this source.

Not only for ether, for explosives and for fuel does this country need alcohol. This need goes into nearly every industrial field, and this need is always increased by war. For a great number of medicinal purposes other than ether, alcohol is essential; the preparation of dyestuffs depends upon it, and the manufacture of many shellacs and varnishes. These are only a few of alcohol's industrial uses.

"But why not use wood alcohol for all these purposes," goes the argument, "and continue using grain alcohol in the manufacture of liquor?" And the nation's chemists answer, "Impossible." The vapors of wood alcohol are blinding, and its use is highly dangerous for all manufacturing.

Efficiency? Economy? What will become of these if the great industrial units, now elaborately organized and busily engaged in the manufacture of alcoholic beverages, must close up shop, abruptly?

Don't close the breweries and distilleries. Transform them. *Instead of making alcohol for drinks, make it for the manufacture of explosives, make it for ether and other medicinal purposes, make it for fuel, make it for dyes and shellacs—make it for every use to which Uncle Sam's chemists can put it in the supreme moment when all things must go to the melting pot to be turned to the nation's greatest good.*

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

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- The Ohio State Dental Society
- The Indiana State Dental Society
- The Kentucky State Dental Society
- The Louisiana State Dental Society
- The Northern Ohio Dental Society
- The Northern Indiana Dental Association
- The Eastern Indiana Dental Society
- The Southwestern Michigan Dental Society
- Odontological Society of Western Pennsylvania
- The Lake Erie Dental Society
- Iowa State Dental Society
- Texas State Dental Society
- Tennessee State Dental Society
- Section on Stomatology—American Medical Association
- Interstate Association of Anesthetists

and Several Local Dental Societies

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REGULAR CONTRIBUTIONS

THE CAUSES AND PREVENTION OF CARIES OF THE TEETH*

BY W. H. O. MCGEHEE, M.D., D.D.S., CINCINNATI, OHIO

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> "*Prevention*—The prolongation of life by the suppression of preventable disease is of much greater value to the state than the cost of the means employed. To ward off the calamity of disease and to prevent the spread of a pestilence is to increase the sum of human happiness and to elevate the race."

A REVIEW of the history of the medical profession will reveal the fact that her disciples, up to very recent years, were largely engaged in the routine work incident to the prescription of remedies for the relief of the bodily ills with which they had to deal, or the mechanical application of surgical procedures to those pathological conditions which did not prove amenable to other methods of relief. In recent years, however, through the teachings of many of the advanced thinkers, the trend of thought in medical education and practice has been to quite a degree revolutionized, with the result that the valuable idea inculcated in the familiar saying, "An ounce of prevention is worth a pound of cure," has received a great deal of consideration, resulting in a marked impetus toward the investigation and application of hygienic measures tending to prevent and eradicate the diseases of mankind.

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*Read before the Summit County Dental Society at Akron, Ohio, April 13, 1917.

It is but natural that, following this modern trend of development, this idea should be rapidly grasped by the profession of dentistry, which has been concerned largely up to a very recent period with curative or restorative mechanical procedures and the alleviation of the ravages and results of disease processes, either through the placing of some protective substance, stopping or filling in the line of progress of the disease, with the general idea in view of temporarily or permanently inhibiting the further progress of the disorder, or by the construction of mechanical substitutes for lost tissues. As a consequence, it is now believed by many that the practice of dentistry is on the verge of a great upheaval, and that in a rapidly approaching future it is to be largely prophylactic in character, its devotees being principally interested in the prevention and abolition, instead of the cure of the conditions with which they have been concerned in the past.

It is the purpose of this paper to discuss more or less briefly some features in regard to the etiology of caries of the teeth, together with their bearing on the measures which would seem to be rationally expedient in their application for its prevention, in order that we may arrive at the establishment of a definite working basis for the profession, and from which the dental practitioner may formulate a daily routine course of procedure for his patients to follow. In this discussion we shall endeavor to establish, as nearly as it is possible to accomplish it, at the present stage of progress, the essential causes which concern us in arriving at the conclusions to be hereinafter made. If we can first discover the true cause of a condition, the application of a suitable remedy for its relief is as a rule a comparatively simple matter.

Regardless of the mass of work which has been done along this line, we are compelled to admit that the unraveling of the mystery of dental caries is still far from accomplishment. At the same time, some small advances have been made along certain definite lines since the scientific labors of W. D. Miller, with the result that by picking up and weaving together a thread here and there, we may truly feel that the light of better things is beginning to shine upon us. The difficulties relating to the working out of the unsolved problems of dental caries are largely those of physical and physiological chemistry. Many phases of the question lie wrapped in the study of the physics and chemistry of the organic colloids and the crystalloids. All living matter is composed of colloidal and crystalloidal material, and an extensive parallelism exists between the laws which govern the reactions of these substances in vitro and in the living organism. At the same time, many theories and hypotheses which have been worked out in the laboratory do not successfully stand the test of clinical experience. This is due to the fact that the laboratory experiments are a study of lifeless matter.

For a complete understanding of the living, we must work out many phases of our reactions on living matter; whatever progress we may make, however, there always remains an unsolved portion, the kernel, as it were, of vital phenomena. In the words of a great physiologist, "Life can perhaps be better understood only through life itself."

EXTERNAL AND INTERNAL FACTORS

It is a self-evident fact that caries must be due to causes arising either outside of or within the teeth, or both. The available evidence at our disposal strongly points to the conclusion that it is due in most instances to a combination of both internal and external factors. The external factors relate in quite a degree to the local environment of the teeth themselves, but the state of the secretions of the oral cavity in which these organs are bathed is largely regulated by systemic conditions. The internal factors concern more especially those relating to the nutrition and structure of the enamel and dentin.

HEREDITY, CIVILIZATION AND DIET AS GENERAL PREDISPOSING CAUSES

Prominent among the general predisposing causes of caries are mentioned heredity, civilization and improper dietary. The question of *heredity* as an important causative factor has been largely discussed of late. At this time it is of interest because it is now claimed that caries is not in itself a disease, but is a morbid state, a pathologic condition, as well as a symptom of general physical deterioration. Carl Rose is authority for the statement that "Decay is not a disease in itself, but a symptom of general physical degeneration, the gauge to human health." Regarded in the light of the present development of biological science, however, decline of the teeth must be ascribed not to degenerative tendencies but to panmixia. By panmixia is meant the discontinuance of selection with an organ for a characteristic quality, with the result that an individual possessing this organ or quality to a greater degree than the average or normal condition, is not favored with reference to duration of life or reproduction above the individual in whom they are defectively developed. A study of statistics frequently indicates certain associations between the quality of the teeth, the hair, the eyes and other organs, as well as such conditions as cleft palate. This is attributed to the inheritance of variants, a study of which is now occupying the attention of many biologists.

Prominent among the numerous causes of the disorder which may be grouped under the general heading of *civilization* is that of increased brain work, which leads to an accentuation of the activity of the thyroid glands. It is conceded that stimulation of the secretory functions of these glands leads to increased elimination, or improper assimilation of calcium, and finally results in diminution in the alkalinity of the saliva. The question of the bearing of disorders of the endocrine glands on the production of caries has been discussed in a former paper, which appeared in the *American Dentist* for September, 1915, and it is not within the province of this communication to enter again into that question, except to remind my hearers of the bearing of disturbances of this nature on calcium metabolism, as well as on the glycogenic content of the saliva.

A thorough discussion of *dietetics* in their causative relationship to the condition would be beyond the limits of this paper; however, I desire to touch on a few points in this connection. Edward C. Kirk has emphasized the fact that excessive consumption of certain carbohydrates may lead to faulty metabolism of these products in the liver and the production of an excess of fermentable glycogen in the saliva, with consequent increased susceptibility to caries. Numerous writers have brought out the fact that excessive sugar consumption results in an increased production of mucin in the oral secretions, thus facilitating the localization of food masses and the formation of bacterial plaques.

Another essential consideration in connection with the question of diet is the importance of including sufficient lime-containing foods in the dietary. The organism requires a large daily supply of calcium in order that the metabolic processes of the body may be carried on properly. Deficient lime consumption as a result of lack of it in certain carbohydrates and proteins results not only in deficient tooth and bone formation, but in a softening of these tissues after they are fully formed, since metabolic processes are taking place here at all times. Bunge, of Basel, and Sherman, of Columbia University, agree that half of the civilized world is suffering from lime starvation. Since the body loses in the excreta about thirteen and one-half grains of lime daily, it is evident that this must be replaced through the consumption of lime-containing articles of diet.

A phase of the subject of diet in its bearing on caries production, on which too little stress has been laid, is that of its influence on the general condition of the lower bowel; a preponderance of protein foods frequently has a tendency to lead to intestinal stasis and constipation, with resultant toxemia and lowered bodily vigor, whereas there is a lessened tendency in this direction with the carbohydrate foods. This has an important bearing on the susceptibility of the individual to caries of the teeth, not only through its effect on the general health of the patient, thus leading to lowered resistance of the teeth, but through its influence on the condition of the saliva itself. I cannot better emphasize what I wish to say in this connection than by quoting from a recent communication of J. H. Kellogg, who says:

"In the writer's opinion, it is just as important for the conservation of the teeth to keep the colon clean and free from masses of stagnating and putrefying food remnants as to brush and cleanse the teeth. The colon is a most efficient incubator, and when the dominant flora is proteolytic in character, stasis will necessarily give rise to the production of such enormous quantities of putrefactive products that the poison-destroying ability of the liver, kidneys, thyroid, suprarenal capsules and other structures is overtaxed, and the tissues are flooded with such quantities of toxic material that the alexins and the enzymes of the blood, which normally afford ample protection through inhibiting the growth of bacteria, become inoperative. The salivary and mucous secretions of the mouth become deteriorated, deficient in germ-destroying and inhibiting elements, so that the fluids with which the teeth are bathed do not protect them, but rather furnish favorable nutrient media for the development of destructive organisms, which are thus permitted to form in colonies on the gums or the teeth and carry on their destructive work. It is quite as important that the patient should be taught how to make his bowels move efficiently three or four times a day as to instruct him in the use of the tooth brush and other mouth-cleansing measures."

With much of the above I am in agreement, although the proposition in regard to the inhibitory function of the saliva on the growth of bacteria still remains to be worked out. It would seem that the parotid saliva does have this effect on certain staphylococci and streptococci.

It is now seen that the subject of a proper diet is very large, and one which should receive increasing attention. A study of its relationship to susceptibility to dental caries will reveal the fact that we do not have to deal merely with the question of the establishment of a balanced ratio of proteids and carbohydrates on a calorimetric basis, but that we also have to deal with the question of a tolerance on the part of the patient for these classes of foods, in order that we may establish, as nearly as possible, a normal nutritive balance for each individual.

VITAL RESISTANCE OF TOOTH STRUCTURE

It has been held in the past and, in fact, it still is believed by many men in the profession today, that the enamel and dentin are not subject after tooth formation to building up and retrogressive changes from within the pulp. I believe that little further progress in the discovery of the causes of dental caries will be made until this misconception of facts is utterly abolished. In a paper read before the National Dental Association at its annual meeting at Cleveland, and published later in the *Dental Cosmos*, as well as in another report which appeared in the *Archives fur Zahnheilkunde*, Dresden, on the staining action of colored dentifrices on tooth structure, I conclusively proved the fact that enamel and dentin, vital or de-vital, are subject to the penetration of staining agents from without or from within, via the dentinal and Causch's tubes. A short while after that Dr. Theodore von Beust demonstrated the same fact through similar experiments, and showed in an article in the *Cosmos* a series of beautiful photomicrographs, illustrating the vascularity of enamel.

When the supply of alkali in the blood is deficient in such diseases as rickets, osteomalacia, gout and diabetes, the organism always invades the hard structures, such as the bones and teeth, and takes away their contained alkali. This is accomplished through the fact that ammonium chlorid is formed in the blood in these conditions, which, although not an acid, acts as such, invades these hard tissues and produces a dissolution or softening of them; thus a predisposition to the action of the acids and bacteria of the mouth is created, resulting in an acceleration of the progress of caries.

You know that during certain pathologic processes, such as caries, the dentinal fibrillæ will deposit additional quantities of calcium salt. An excellent example of this is the presence of the transparent zone of Tomes, which is frequently found underlying the layers of decay in the dentin, and which is an effort on the part of nature to resist the further inroads of this process. Other familiar examples are seen in the presence of tubular calcification under abraded and eroded areas. During such conditions as pregnancy, typhoid fever and other diseases which might be mentioned, the teeth are more prone to decay. Investigators in the past have told us that this is due to the fact that during the progress of these diseases, care of the mouth is neglected, and it is natural for decay to occur more rapidly under those circumstances. That attitude in connection with the matter is taken by men who are opposed to the vital theory in regard to resistance in the teeth against disease processes. We now know, however, since increased attention has been given to prophylactic work in the mouth in hospitals by physicians and dentists in general, that many of these cases of pregnancy, typhoid fever and similar conditions are receiving daily oral hygienic attention, and yet notwithstanding this they are still markedly subject to the ravages of decay. How do we account for that, then, in any other way except through acknowledgment of the fact that the resistance of these tissues is lowered, together with those of other parts of the body?

There is very little organic matter in the enamel, and we have to admit that this tissue cannot possibly be as subject to constructive and destructive changes as the dentin. At the same time, there is some organic material present there, and even this tissue is, in my belief, capable of some degree of vital resistance.

The establishment of the fact that the enamel and dentin are subject to nutritional processes and to constructive and retrogressive changes has an intimate relationship to caries production, as will readily be seen through a recognition of the establishment of internal resistance to disease processes, one of the factors previously mentioned.

I trust that enough stress has been laid on these systemic predisposing causes to emphasize the importance of their causative relationship to caries production, and the necessity for their regulation, as far as possible, in formulating a schedule for the establishment of daily preventive measures.

LOCAL PREDISPOSING AND EXCITING CAUSES

The caries process may be divided into two characteristic phases, viz.:

First, Penetrative Fermentation, viz., a dissolution of the inorganic salts of the enamel and dentin through the action of lactic and other organic acids, which result from the fermentation of carbohydrates by the oral microorganisms.

Second, Disintegrative Putrefaction, viz., a destruction of the organic colloidal material, the proteins, through the action of putrefactive bacteria. The changes incident to this putrefactive process are the same as those occurring in the putrefaction of all albuminous substances (which contain the elements C., H., O. and N., in their molecule), resulting in the ultimate formation of such end-products as CO_2, NH_3, H_2S, H_2O, HC_2HCO_3 and other combinations of simple structure.

The enamel, owing to its small amount of colloidal constituents, is destroyed largely through fermentative processes, but as will be readily understood, the putrefactive process is a large factor in the disintegration of dentin, owing to the presence of a large amount of albuminous material in the tubules, as well as in the matrix. The above agencies, then, may be considered the exciting causes of the caries process. These exciting causes are controlled to a degree by the general predisposing causes already mentioned, and through them by very important local predisposing causes. These may be conveniently grouped under the general heading of (1) defective structure of the enamel and dentin, (2) irregularities of the teeth, and (3) vitiated or deficient oral secretions.

That such defects as faulty union of enamel in pits and fissures, cracks in or fractures of the enamel, hypoplasia of the enamel and dentin and imperfect deposition in these tissues of calcium during the formative periods increase the susceptibility to the carians process is well understood and needs only casual mention. The influence of irregularities, abnormal interproximal spaces and imperfectly-constructed contact points is also well recognized. We are at present concerned with the question of the influence of the fluids in which the teeth are bathed, the local environment, as etiologic factors.

As already mentioned in the discussion of the influence of diet on the condition, an excess of glycogen or of mucin in the saliva, as a result of faults in the dietary, is to be avoided, since the one is likely to influence the fermentation process, while the other will accelerate the agglutination of food masses and the formation of bacterial plaques on the teeth.

TABLE SHOWING FACTORS CONCERNED IN TOOTH DECAY

The following tabulation, based largely on the thoughts comprised in the preceding paragraphs, would appear to be a rational exposition of the at-present supposed causes of caries of the teeth:

A. *Local Factors:*
  (1) Fermentation of carbohydrates.
  (2) Formation of bacterial plaques.
  (3) Accumulation and putrefaction of proteids, affording a nidus for the localization of fermentable material and harmful bacteria.
  (4) Precipitation of mucin, resulting in acceleration of plaque formation.

(5) Excessive excretion of fermentable glycogen in the saliva, as a result of faulty metabolism by the liver of carbohydrate foods, or of irritation of the pituitary body by reflex action from pathological dentition and similar causes.

(6) Diminution in the amount and alkalinity of the saliva, the natural cleansing and acid-neutralizing agent.

(7) Irregularities of the teeth.

(8) Abnormal interproximal spaces and improper contact points.

(9) Defective tooth structure from faulty union of enamel plates, imperfect deposition of calcium during the formative periods, cracks in or fractures of the enamel, hypoplasia of the enamel and dentin and similar conditions.

(10) Recession of the gums, exposing unprotected dentinal surfaces at the necks of the teeth.

B. *Systemic Factors:*

(1) *Improper dietary:* (a) Excessive carbohydrate diet, accelerating glycogen formation in the saliva; (b) excessive consumption of sugars, stimulating an increased deposition of mucin; (c) improper nourishment of infants (bottle-fed), resulting in improper metabolism of calcium salts with resultant poor tooth and bone formation.

(2) *The sedentary life*, resulting in lowered bodily vigor, anæmia, leukæmia, digestive disturbances, malnutrition, faulty metabolism, acidosis, nervous exhaustion and similar disorders, with consequent lessening of the vital resistance of the entire body, including the teeth.

(3) *Lowered bodily vigor*, from any cause, including inheritance and disease processes of any character, resulting in the production of poor tooth development during the formative stages or of retrograde metamorphosis in the same organs during later periods of life.

(4) *Affections of the ductless glands*, resulting in (1) increased deposition of salivary glycogen; (2) interference with calcium metabolism in the tissues of the body, including the teeth, (3) as well as other imperfectly understood pathological changes.

CHARACTERISTICS OF HUMAN SALIVA

Normal saliva is a watery solution, weakly alkaline in reaction, containing principally alkalis, mucin, CO_2 and amylase (ptyalin), together with such other less important constituents as maltase, oxydase, catalase and potassium sulphocyanate. Its normal rate of secretion is about 1 cc. per minute. The function of sulphocyanate in the saliva has never been satisfactorily determined. The presence of the alkaline constituents serves to neutralize to some extent the acids of fermentation, while the amylase is concerned in the hydrolysis of starches, the other ferments mentioned being also concerned in the digestive process. There has been considerable discussion ot late on the bearing of the amylolitic function of ptyalin on the production of caries. Although its influence is claimed to be negative by such investigators as Prinz and C. Lovatt Evans, the probability of its action as an etiologic factor is conceded by many other authorities, prominent among whom are Pickerell and Michel. The principal physiological function of the mucin is to protect the oral mucous membrane against the action of irritants and to render an easy passage for the food bolus during deglutition.

The principal functions of normal healthy saliva are as follows, viz.:

First: To biologically inhibit the action of certain oral micro-organisms.

Second: To help neutralize the acids of the mouth.

Third: To transform starches into maltose.

Fourth To mechanically wash away food debris.

It may be considered as nature's mouth wash, and a fairly good one unless it is a product of contaminated blood. The degree of alkalinity of the saliva is regulated to some extent by the rapidity of the flow, as well as by systemic factors, viz.: the greater the flow the higher the alkalinity. The amount of salivary secretion is regulated largely by (1) the psychic and mental state of the individual; (2) the amount of water taken into the system; (3) the degree and manner of mastication, and (4) the character of foods and other substances taken into the mouth. The first of these agencies does not concern us here. The others are of extreme importance. Since all of the watery secretions of the body are increased by an increase in the amount of liquids in the dietary, it is but natural that the salivary secretion may be accelerated in this manner. The drinking of hard water, rich in calcium salts, will increase the alkalinity of the saliva, as well as its flow. It is hardly necessary to call your attention to the well-known increase of the salivary flow through the vigorous use of the teeth in mastication. There should be included in the dietary plenty of coarse, dry food, since this not only increases the necessity for increased mastication, but also stimulates the flow of saliva.

STUDY OF DENTIFRICES

If it were possible always to produce a physiological, healthy, alkaline saliva and accomplish proper mastication of suitable foods, caries of the teeth would rarely occur. Since this is manifestly impossible, it is necessary to assist nature in her efforts by the adoption of artificial measures. Most of the proprietary dentifrices on the market today have some objectionable qualities. Prominent among these are the presence of too much soap, which, on account of its alkalinity, destroys the digestive ferments; another is the incorporation of artificial coloring matter to improve the appearance and increase the sale of the article. Mouth washes should be clear solutions and powders, and pastes should be as nearly white as possible, to prevent discoloration of tooth structure. Regardless of the work which was done in this connection a number of years ago by the writer, dentists are continuing to recommend colored dentifrices to their patients, regardless of the undoubted harm which they do. Notwithstanding the presence of numerous other detrimental components in some of the widely-advertised dental preparations, dental practitioners are allowing their patients to use them.

Lime water and physiologic solution of sodium chlorid have been recommended in the past by various authorities, as mouth washes, the latter on account of its well-known antiseptic effect, and the former on account of its alkaline reaction. These preparations, although they both possess undoubted advantageous properties, have never come into general use, and never will on account of their disagreeable taste.

PROPERTIES OF AN IDEAL DENTIFRICE

A dentifrice should possess the following qualities, viz.:

1. It should be cleansing in action.
2. It should be of pleasant taste.
3. It should be colorless.
4. It should be non-caustic to the soft tissues.
5. It should be mechanically and chemically non-abrasive to the enamel.
6. It should be non-poisonous to the organism as a whole.
7. It should be non-inhibitive on the secretion of saliva.
8. It should be non-destructive to the salivary ferments.
9. It should be very slightly alkaline in reaction.

It will be perceived that there are very few, if any, preparations on the market which possess all of these qualifications. Those most nearly approaching them should be prescribed. There has been quite a good deal of discussion of late as to the most efficient manner of maintaining the tooth brush in a sterile condition. The method advocated by Dr. Hugh MacMillan is by far the best and simplest which has come to my notice, and consists of sprinkling a liberal supply of table salt on the bristles after the mouth toilet is complete, allowing it to remain until the brush is ready for use again, when it may readily be washed off. Thus all bacterial life on the brush is inhibited during the interim.

Your essayist is convinced that if the following schedule of procedures were adopted by the dental profession as a whole, it would finally result in at least a very marked amelioration of the condition under discussion, if not in its total eradication from the race:

SCHEDULE OF PROCEDURES EXPEDIENT FOR RELIEF

1. Education of students in the schools and of the profession in general as to the importance of the subject and the means to accomplish the desired result.

2. Continued and systematic research in the unsolved phases of the etiology and pathology of caries.

3. Securing of greater co-operation on the part of the medical profession in the recognition of the bearing of systemic conditions as causative factors and in the administration of constitutional treatment.

4. Education of the public through a continuation and extension of the oral hygiene movement, the establishment of institutions similar to the Forsyth and Eastman Dental Infirmaries throughout the country, the further equipping of dental clinics in the schools and commercial institutions, and the greater development of *social dentistry* in general.

5. Adoption and application of the following local and systemic preventive routine as indicated, viz.:

A DAILY SCHEDULE

1. *General hygienic measures:* Maintenance of good health and bodily vigor through regular exercise, abundance of sunshine, fresh air, baths and similar measures. Avoidance of intestinal stasis, toxemia and similar conditions.

2. *Diet:* Daily and regular consumption of an abundance of *hard* water. Regulation of the proteid and carbohydrate constituents of the dietary according to the needs of the individual. Daily intake of an abundance of lime-containing foods. Inclusion of acid fruits in the dietary, especially at the beginning or end of a meal.

3. "*Fletcherizing:*" Sufficient mastication of adequate quantities of coarse, dry foods.

4. *Toilet of the mouth:* (*a*) Absolute and continuous cleanliness of the mouth through the systematic institution of an oral prophylactic regime, by means of the brush, toothpick, floss silk and similar measures. (*b*) Keep the toothbrush sterile by freely sprinkling it immediately after use with common table salt, which is allowed to remain until the next cleansing operation, when it is washed off in running water before using. (*c*) Regular and frequent use of a colorless powder or paste, containing as nearly as possible the additional ideal characteristics previously mentioned—this to be used in conjunction with, or followed by, a colorless, mildly antiseptic, antiphlogistic, slightly alkaline wash.

An Accurate Method of Taking Impression for a Bridge and Making Cast

Arrange abutments in place; take some plaster on mixing knife and place in open mouth between occluding teeth and abutments, asking patient to close and keep the mouth so. When hard, ask patient to gently open. The impression will usually break mesio-distally. Carefully join together with Ash's model cement, arranging abutments firmly in place; then pour Mellot's metal into impression of teeth occluding with bridge; coat the whole impression with a separating medium and cast in plaster, the lower half extending distally or lingually with a flat surface, cutting V-shaped grooves; paint with medium, and cast upper half. You will then have the correct bite, an accurate articulator, and no fracturing of occluding cusps.

—*W. August Miller, Commonwealth Dental Review.*

ONE HUNDRED PER CENT. CONDUCTIVE?

BY R. L. MCINTOSH, D.D.S., CLEVELAND, OHIO

A SHORT TIME ago a dentist asked me if I considered novocain used in conductive anesthesia as a hundred per cent. anesthetic. I replied, "No." Faulty technic or undesirable patients do not, of course, detract from the medicinal properties of the drug. However, it happens occasionally that we fail to get results in cases where we positively know from symptoms that the solution has been deposited in the desired area. This is strange reasoning, you will say, but is nevertheless true. There are patients who manifest pain when they are not suffering in the least. They are undesirables for the dentist in the sense that there are undesirable citizens according to the Roosevelt standard. A patient of this type is difficult to work for. You have gained nothing by giving novocain, for after the parts are completely anesthetized they will behave in a manner to prevent operating. After you have succeeded in finishing, it is likely they will inform you that you did not hurt them. It must be understood that we have reference to cases where complete anesthesia from the injection has taken place, where we are able to probe an exposed pulp without pain, provided patient is not made aware of your intentions. Cases of this kind seem to point to the fact that apprehension or some other condition for which no word has yet been coined, is the real cause of failure to gain good results. From the dentist's standpoint this is no small matter as the nervous strain is as great as though conductive anesthesia had not been made. For such it is somewhat risky to make the injection. Cautioning for immobility seems to be of no avail. If a steel needle is used there is danger of breakage and there are instances of iridio-platinum needles being broken. These accidents complicate matters, as it is almost impossible to recover the needle without a minor operation.

It is best to study your patients before starting conductive anesthesia. If they are of the undesirable types, do not undertake it. They will think more of you if you do not try it. A nervous child is somewhat of a problem along this line, as is a patient who speaks a different tongue, and you are unable to make him understand what you are about to do. A foreigner usually takes the chair with a keen expectation of being hurt and assumes that a slight pricking sensation will immediately lead to something more severe. They are therefore quite likely to suddenly move the head in such a way as to break the needle and complicate matters.

With the desirable type quite another story can be told; we more nearly approach the one hundred per cent. standard. Everything being sterile, and with a few cautioning words regarding immobility, you soon obtain results which not only make a pleased patient, but rob the dental chair of its old-time horror and enable you to operate with much less nervous strain. In conductive work it is necessary to be on the alert to prevent drawing too near the pulp. Novocain seems to be the "open sesame" for some who use it. Many times have I seen operators cut to the extent that hemorrhage occurred from the pulp, unknown to the patient. This, of course, means trouble after. In the hands of a skillful operator this form of anesthetic is a great blessing to both patient and dentist.

The very nature of the whole matter of getting results with this or any other form of anesthesia is in itself proof of the impossibility of fixing a percentage standard for this or that method. There will ever be a variety of experiences and results as there are hands to administer and to take. Some startling discoveries must yet be made before it can be otherwise.

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INLAYS AS ABUTMENTS*

BY H. K. KELLOGG, D.D.S., LOUISVILLE, KY.

OUR VERY SUBJECT shows progress and advancement. There was a time a few years ago when an inlay as a filling was considered a broad field and the inlay principle was put to the test. These principles have been established and the usefulness of the inlay has multiplied, until today with improved cavity preparation, casting, etc., a new field is open for abutment pieces for bridges and removable mechanical appliances.

Inlays, with a pin or post in pulp chambers, form a sure means of support and a most satisfactory means of anchorage. Vital abutments can be used by using small pins missing the pulp, and cavity so prepared that sufficient retention is obtained. The Carmichael attachment, using the staple, not involving the vitality of the pulp, is another means. The combination staple and pin, either into the pulp chamber or smaller pins into sound tooth structure, is yet another. The extensive use of the, staple, involving several surfaces of an abutment and a shallow groove to accommodate a wire to fit, make a safe and substantial attachment.

Have you not been surprised many times on seeing an extracted tooth that had been used with an inlay abutment piece, at the small amount of the tooth used for the support of the inlay, sometimes not extending to the neck of the tooth? It seems to me with this in mind if we would extend our inlays both gingivally and otherwise, our anchorage would be greatly increased.

It has been my experience that inlays have broken down most frequently when the work, bridge work, etc., has been extensive or of a rigid type. This has persuaded me that the bridge units should be as small as possible and an effort made to have the abutments of sufficient strength, but not have abutment pieces fixed rigidly to the bridge at both ends. By means of grooves, pits and sockets, I have been able to give the abutment teeth almost a normal tooth movement and at the same time have greater assurance of stability.

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*Read before the Kentucky State Dental Society, May, 1917.

Frail and badly-decayed abutment teeth that otherwise would be hopeless as abutments of a bridge or support, may serve a valuable purpose as an aid to assist with an inlay holding a groove or pin at one end of a bridge.

908 Starks Building.

DISCUSSION

Dr. Raymond Grant: I had no idea that I was going to be called on to discuss this excellent paper. The fact of the matter is, I think there is very little to say about it.

However, there is no doubt but what a great many of the inlays used in the past for the attachments of bridge work have failed, and their failure has been largely due to the fact that they have not been properly constructed. It was but a few years ago that we thought all inlays for the support of bridge work called for the destruction of the pulp. This has been changed in the last few years and the change has been brought about by the fact that we are all beginning to realize at the present time the seriousness of the removal of the pulps of the teeth. It has been brought to our mind by the present discussion all over the country of the effects of the foci of infection in the mouth.

There is just one other thought that I thought was especially good, and that is that we make this attachment on one end rigid, attaching the other end of the bridge work as described by Dr. Grant, thus allowing the dummy individual movement and doing away with the fixed, rigid piece of bridge work in the mouth.

OMAHA FREE DENTAL DISPENSARY

BY EDWARD H. BRUENING, OMAHA, NEB.

The Omaha Free Dental Dispensary for Children, an institution equipped with five outfits of the very latest type, all in gray enamel, is doing some good work in this city. We opened February 15, 1917, and have taken care of the mouths of 1300 children, averaging about three and one-half operations per child. There are four paid workers, a secretary, two assistants and a full-time operator. One hundred Omaha dentists make up the volunteer staff, each giving one-half day per month. The money to equip the place was raised by popular subscription, none larger than $200, and most of them from $3.00 to $5.00. This campaign was carried on by the Omaha dentists.

Recently our fund was running low, and we had to have some money to carry us through the summer. We did not want to launch a campaign for subscriptions at this time, so the Billings Dental Supply Company gave us a Ritter chair for a raffle prize. The tickets were bought by those in attendance at the Nebraska State Dental Society meeting. This brought in $750.00. The chair was won by Dr. C. W. Hartwig, of Kenasaw, Neb., who very generously and graciously returned it to the dispensary. This netted $250.00 more, making an even thousand dollars enough to carry the work through the summer.

THE PHYSIOLOGY OF CROWN AND BRIDGE WORK*

BY E. H. HUBBUCH, D.D.S., LOUISVILLE, KY.

IT IS the utter disregard of this subject that has brought upon the dental profession in general and upon the American dentist in particular the condemnation of the great English surgeon, Sir Hunter. In scathing rebuke he refers to some of the bridge work which came under his observation as "septic dentistry." And such verily is much of the bridge work that we see today, not only of the fixed type, but even of the removable.

From the article published in THE DENTAL SUMMARY of March, 1917, and one which all of us should read studiously, we see that Dr. Cummer, our honored guest, lays particular stress upon the physiological requirements of removable bridge work. His supreme effort seems to be to impress upon us the importance of keeping the gingival tissues in a physiological condition. It is my intention, after this assertion, to confine myself to the consideration of this subject as applied to fixed types of construction.

Physiology is the study of tissues, healthy tissues, and their functions. The tissues, then, must primarily be healthy, or must be made healthy. May I not truthfully say that oral prophylaxis should precede all dental operations, excepting only palliative measures? Bringing about normal conditions in the mouth certainly gives us a more desirable field to operate in at subsequent sittings and also makes a decided impression on our patients. Wherein is the logic of prophylaxis after the other dental operations have been completed?

With this accomplished, partly if not completely, if we desire to preserve healthy conditions in the mouth, our fixed bridge must be indicated. The indications for fixed structures may be given as, first, sufficient number of abutments; second, properly located; and third, of stability sufficient to comply with the demands that will be made upon them. If any of these is lacking, failure is invited, and physiological tissues become pathological.

Two abutments are overtaxed when called upon to carry six teeth. Only a few weeks ago a construction of fourteen teeth with two second molars and a central as abutments had to be removed, as the central was completely exfoliated and the molars so loosened that extraction was necessitated. What shall we say of a dentist guilty of such practices? This patient is now doomed to the wearing of a full denture, whereas a removable structure, made two years ago when those abutments were physiological, would have served for at least several years longer and we may reasonably say, far more comfortably than could be expected of a full denture, however well constructed.

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*Read before the Kentucky State Dental Society, May, 1917.

Physiological requirements include canal operations of whatever nature, and the assurance that future trouble from this source need not be feared. The necessity of extreme care in this direction is emphasized by the prominence that this subject enjoys at all dental meetings.

The removal of the pulp and proper filling of the canal of any tooth is a requirement when the proper preparation of that tooth for its abutment piece endangers the physiological condition of the pulp. Favorably-shaped teeth, which consequently may be prepared for telescope crowns with little mutilation, are better preserved in a vital state. This assertion may bring about some discussion.

If a fixed bridge is indicated it must stay fixed. Many failures and much pathology is produced by one end of a bridge becoming loosened. Therefore, it behooves us to use such abutment pieces as will remain anchored when the bridge is cemented to the abutments. We have all had experiences with inlays as abutment pieces, some of them not so pleasant; but we must admit that the inlay, properly applied, has its place in bridge work of both fixed and removable types.

Shell or telescope crowns, dowel crowns and inlays rank in the order given as abutment pieces when considering security of attachment.

Wherein do abutment pieces produce unhealthy conditions? Here I would bring before you the most condemnable part of fixed bridge work. If we would only hold that free gum margin is sacred, as sacred as it is held by Dr. Cummer, in the construction of removable pieces, one great source of condemnation would be removed.

Ill-fitting bands of shell crowns, sometimes due to improper preparation of abutments, often due to forcing the band too far beneath the gum, particularly in interproximal spaces, produce inflammation that can only be eradicated by the removal of the bridge and constructing one which does not violate in this way.

To hold sacred this free gum margin in dowel crown construction, the only technic practicable in my hands is the indirect or swage method of constructing coping, as I am not able to construct a band that will not irritate the gum, especially in interproximal spaces, without the too-glaring display of gold. It is my belief, too, that better adaptation is secured by the swage method especially when the swaged coping is burnished on the root end, after having been swaged.

Dental anatomy teaches us that the cemento-enamel junction, the line at which the gum is attached to tooth, is nearer the occlusal surface by several millimeters on the mesial and distal surfaces than upon the labial and buccal surfaces, making it extremely difficult, almost impossible, to fit a band for dowel crowns without immediate or subsequent injury to the gum in the embrasures.

In the application of porcelain crowns of the Logan, Davis, Justi, Twentieth Century, etc., types, with or without attached pin, much injury to the soft tissues will result from cutting tooth too far below free gum margin, particularly in interproximal spaces. Spongy, swollen, inflamed tissues result from sharp edges where root extends out beyond crown or crown beyond root.

Another source of pathology comes from lack of point of contact between the end teeth of bridge and contiguous natural teeth. Food lodgment and its results we are all familiar with. We must see that pathology does not result from failure to observe this requirement.

The requirements of occlusion must be carefully observed. Elongations in either arch must be corrected, restoring normal plane of occlusion. This is a requisite for overcoming interference with mandibular movements.

Properly-carved occlusal surfaces, with nature's own product as our guide, obtain for proper functionating. Too deeply carved cusps produce interlocking, and thereby impede the natural movement of the mandible. Together with this interference the resultant lateral stress will surely undermine the stability of the abutments.

With physiology in mind, our thoughts must never stray from the word "Hygiene." First, we place the mouth in hygienic condition; second, our construction must be made hygienic, and third, the patient must be instructed to keep it hygienic. In the lower arch posterior to first bicuspid, where gold is not objectionable, being out of the range of vision, occlusal surface dummies are most applicable from the hygienic standpoint.

In like location in the upper arch, individual saddle constructions with removable and replaceable teeth, giving lingual contour, and leaving no pockets for food accumulation, serve best for dummies. If a fixed bridge cannot be constructed that will be hygienic, then restore the lost teeth in some other way.

That some practitioners of crown and bridge work are able to construct sanitary fixed bridges is admitted by the best men in the dental profession. It is then possible, and if it can be done right by any one, it only remains for all of us to do it right.

The laboratories, and I do not except one, cannot make a shell crown from an impression sent them, even though accompanied by a wire measure, that will fit at the gingival. This is rather a bold assertion, but it is a fact. Some things must be done in the mouth, and one of these is the fitting of the ferrule or band upon the tooth itself to secure proper festooning that thereby no injury may be inflicted on that sacred free-gum margin. To make a crown from a plaster model is criminal, and I am sure not one of us would permit a crown so made to be placed in our mouth. What is not fit to be inserted in our mouths is not fit for the least of our patients.

Such crowns made by laboratories are bad enough, but what do you think of a request for a bridge, a complete bridge, abutment pieces and dummies, to be constructed from a beeswax bite? This sounds almost like a joke, but it is a sad fact. How in the world a practitioner is able to get them on the abutments is a mystery to me. From personal observation I am assured that the mechanical ability of the men making crowns and bridges in the laboratories is all that can be desired. They do the best that is possible with what is sent them and should not be blamed for this state of affairs. The guilt is upon the practitioners who resort to such procedures, and "septic bridge work" will only cease to be a reality when such practices by dentists are discarded.

The inlay as an abutment piece was heralded with joy. Why? Because it afforded a means of overcoming, not the deficiencies of bands (as properly made they are not deficient), but because their use occasioned less irritation than did ill-fitting, improperly-festooned bands.

The natural teeth in the mouth require attention that they may continue to functionate properly and that healthy conditions may prevail. Instructing the patient how to keep the teeth clean applies whether they have bridges in the mouth or not, and this thought must be impressed on their minds.

In conclusion, I would say, let each of us become a perpetual patient, doing all things as if they were being done for our very selves, and "septic American bridge work" will be no more.

DISCUSSION

Dr. E. D. Rose: I am down for a paper on "Educating the Dentist," but it is not going to be a paper; it is going to be a talk, and I will make that talk right now, as it is along the line that Dr. Hubbuch has just given us.

You know I am located in Bowling Green, and in Bowling Green is located the State Normal School. Well, we have a study club there—not so very many members, but we meet regularly nevertheless. Now, everything that Dr Hubbuch has said is so, but he did not make it plain enough.

The majority of the fillings that we see are septic. We rarely ever see a contact point properly restored. This is certain to cause irritation and ultimately pyorrhea. When a dentist does this he not only produces pyorrhea but he also produces focal infection.

Two or three years ago we had a post-graduate course, and we went back and studied; but I am sorry to say that the attendance was not any where near what it should have been. And the majority of those who attended that course quit studying just as soon as they got their diploma. We realized what mistakes we made, but the public was kind to us and thought it was a fault on account of ignorance that we were doing these things. Now that we know these things, we are not going to be looked on as a set of tradesmen instead of professional men, and we are going to get into trouble—get into court.

When I located in Warren County nineteen years ago, I think there was scarcely an acre of alfalfa in the county, and very few patches of berries. But the government sent men down there and they organized the farmers—got right out in the field with them and showed them how to raise alfalfa, berries, etc., and now on every farm you see a field of alfalfa. We raise 220 crates of berries per acre, too, now.

Now, my suggestion is this, and it is something that I have tried out myself: That is, when I want any one special piece of work, I get someone to come down there to my office and spend a week with me—someone who is especially acquainted with that special piece of work.

It is impossible to treat pyorrhea without conductive anesthesia, and the only way to learn the technic of conductive anesthesia is to have a man come right into your office and demonstrate it to you on a patient.

Now, I would suggest that we appoint a research committee, or some kind of a committee, to select a demonstrator to handle this kind of work in this manner. It is going to be a man hard to find. It is going to have to be a man who is an expert exodontist, an expert operator, plate worker, orthodontist, business builder and bookkeeper. Now, who is going to pay this man for his time is the next question. I say, let the patient pay him. The physician sends out of town for a surgeon when he doesn't feel capable of handling a case, and the patient pays the surgeon and the physician, too; I don't see why a dentist couldn't do the same thing.

There are some here who will say that this plan is not feasible; that the patient will not pay. I will name a patient for him who will be glad to pay this fee. Take Dr. Smith, for example; I can employ this man at the rate of $100.00 per week and pay his expenses from the time he leaves Louisville, say, till he gets back. The patient pays that. He teaches his methods to you right in your own office and the patient pays the fee.

Now, that is my suggestion. I want you to discuss this and see if we can organize dentistry all over this state and get dentists to reading and thinking. I would be ashamed to ask the question, "How many men in this house have bought the latest books, some of them the greatest books that were ever written?" Dentistry is a profession and we must get down and study.

Now I would like to have this proposition discussed freely. Please don't say that I am looking for a job. If you can find this man, bring him here, get him here and train him. There is enough talent right here in Louisville, if we could only make use of it. We have some people doing great plate work. Bring a man here and keep him for sixty or ninety days. We can get some of the dental houses to take up this matter and we can keep him busy fifty-two weeks in the year. I will take him one week myself. There is not a man here but who could make as good a dentist as any one in the profession if he would only go ahead and try it.

Dr. Meguiar: I don't know that I can say anything that will add to what Dr. Rose has said. His idea is not a new one; it has been incubated for the last four years. Dr. Rose has a way of conceiving a thing and he gets the idea that it ought to be sprung all at once and that all ought to take it up. Now, we don't all see alike, and some of those who do not see it at once just as the others do are the most dependable in the end and stick to it. I believe some state is going to take this plan up and it remains to be seen whether the state of Kentucky and the members of the dental association in Kentucky will back this up and make it go.

I believe some state will put this into effect some day. It means efficiency. Ecffiency is in the atmosphere today the world over among intelligent people, and it remains for us to do these things. We all know that in the past when things have been advocated they were not taken hold of at first, but when later taken up and put through they made a success. I can see a great many things with Dr. Rose's proposition that spell success—that will get applause of our profession if this is put into operation energetically and sincerely.

Now, the idea of the patient paying the bill is a practical one, and it is something that comes home to us, and I think we should look at it as being for the good of the profession. The idea of having a specialist treat a difficult case will make the patient show more interest in the work and he will be willing to pay the fee.

As to Dr. Hubbuch's paper on crown and bridge work, I don't know that there is any criticism to be made upon his remarks; but to accentuate what he said: One of our large manufacturers said to me in Philadelphia that he had some bridge work to be done and he went to a famous crown and bridge worker (he is known all over the country, and his work is as near perfect as possible), Dr. Peeso. He had the doctor examine the case and asked him what he would charge him. The case required an unusual amount of skilled work and good work, work that would take care of that sacred free-gum margin Dr. Hubbuch spoke about. Dr. Peeso quoted a price of $1500.00, stating that if he was a patient that was not closely connected with the profession the fee would have been $2500.00.

I related this for two reasons. I said, "Why did you not have it done?" He said, "I couldn't stand that kind of a fee." I said, "But you are getting good work." He replied, "But I think I could get it done as well cheaper." So you see that even a large manufacturer looks at the fee side of it.

The other feature is this: In order to do this kind of work, we have to be properly paid for it. We can only do it by getting a good fee for good service. The excellence with which you do it will enable you to get that fee. If you are not capable of treating pyorrhea properly, then send for a man who is capable to come down there to your office and show you how to do it, and let the patient pay for it. Now, this is a little in advance. Why not take it up now? Don't let some other state take it up first. Appoint a committee and make it a success; and I an sure we can make it a success.

Dr. Pirtle: According to this plan we would have to get a specialist in every subject. I do not believe there is any one man who is a specialist in every subject. We all do general operative work in our offices, but to have one man a specialist in every branch of dentistry—that is impossible.

Dr. J. B. Jordon: Each one of these subjects enumerated is enough for any one man. Take crown and bridge, or orthodontia, or exodontia; why are these divided up into specialties? Simply because one man can't master them all. I would like to see Dr. Rose find a man in this state or any other state proficient enough in all these studies to fill this place. We couldn't find such a man today. We might get a man who had one or two of these things, and it would be a good thing, but we can't find one man who could do it all. I would suggest that one man have one specialty or two specialties. I believe a patient would be willing to pay the fee, as Dr. Rose says, but it will take more than one man to cover the field if such a one could be found.

Dr. Burgard: I am afraid that Dr. Rose is looking for a man for $100 a week who could command $500 a week. If we could find such a man it wouldn't take long for him to locate most any where. Yet, at the same time, I believe these practitioners rather remote from the great commercial centers do not realize under what handicaps they are working. If Dr. Rose would start and devote the entire year on one subject and read up every thing possible on that subject; for instance, take up inlay work, and do the other work the best he knows how, I believe that at the end of the year he would be doing inlay work a great deal better than before. Then the second year take up another subject and at the end of the second year take up another subject, etc. After he has completed two or three years of this work the rest will come easier, just as in learning languages. This subject is a wide one and I am sure we ought to give it the best of attention.

Dr. Meguiar: I think Dr. Rose made an oversight. I think I see where the trouble is. Dr. Rose seems to think that one man should do all this work. I don't agree with him. I think we ought to find one man who could do two things well. It would be better to have more than one man. I don't think it would be long before these men would be busy. Another point is that cases in the small town and inland town are often referred to the city men. The city man will not lose one dollar as a result of putting this in operation, for the simple reason that it will get him prominence; but you can operate in this way in a small town: If people will not take the trouble to come to the city, the dentist could bring a specialist to the small town to do this work, thereby saving the patient's time. The specialist will not lose business but will gain prominence, and I believe we should have a specialist for each line, for one man could not begin to take care of the business after the plan was once gotten under way.

Dr. Tileston: I am much interested to hear these members talk, especially those from out of the city. We want them to come up here to talk. I want to say a word about Dr. Hubbuch's paper. I think we have been very negligent on those very points that Dr. Hubbuch brought out. I think that the majority of the fixed bridges had better not be in the mouth at all, from the results of my own work and the results of work I see of others. I hold that individuals who make a study and practice will accomplish more than the other individual does who does not study along the lines he is working. Fixed bridge work cannot be kept clean. I think that the tendency is to get away from the fixed appliance, and from our so-called "removable bridge work," and to have something that can actually be taken out and washed if it is necessary to make it aseptic.

Now as to Dr. Rose's suggestion: It seems to me that this is an idea that will not work out exactly—for a man to take a course in a special branch to bring some one to his office and teach him there rather than taking a post-graduate course. Necessarily this sort of a man would have to be a man who is capable of teaching under those conditions, and such a man is difficult to get. There is a movement that was started from the colleges in Philadelphia to establish a six-year course and to give post graduate courses, so that if any one wanted to learn something and learn it right there would be the opportunity to learn something and learn it in a worth-while way. I do not see so very much that is practical in this suggestion to get a half-done specialist to come and teach you in your office. It is a serious thing to pay $100 to $200 per week for instruction to some man who had been taught in Louisville for a few months, and it would be practically impossible to make it worth while. It would be hard to find a man who could make it worth while in all lines. It would not be child's play. We would want a man who knows how to do it and knows how to tell us how to do it.

Dr. Rees: I know we get a good deal of information and help from these meetings, but we do not get as much as we would if we had a real specialist to teach us in our office. We couldn't have a man to come and pay him a fee like Dr. Meguiar spoke of. It would be my idea to have a specialist that we could go to like Dr. Tileston spoke of and as a result we could get much better results. We can attend these college post-graduate courses, but I would like to go to some one here. I was down here Christmas to Dr. Rounds', and I got a great deal, but I did not get all I wanted. I hope the time has arrived that we will take up this subject in earnest. As a rule dentists have to do it all, and as a result many of us don't do it well. You can see it in the average run of mouths. I believe we should tell our patients that unless they can keep this work clean they had better not have it put in at all. I am not competent to put in a removable bridge, and I never did; but I am fast getting to the point that I hesitate many times to recommend bridges at all. Dr. Hubbuch, I believe, spoke of the gingival gum being lacerated. I was talking to Dr. Smith today and I told him that if I had a specialty it was in mounting a Logan crown. You can hardly get them today—the supply men don't keep a very large stock. I never grind a root off to the gum margin; I always want to contour the band at the gum. If we will do this, I believe we will save that tissue from being effected, thereby preventing serious trouble and that is the thing I am afraid we are overlooking. Sometimes I just think I will quit.

Dr. Rose: It is a mistaken idea that one cannot do fixed bridge work properly. You gentlemen who believe that it can't be done should go to Knoxville and see Dr. Slader work. If old Dr. Crawford was living I would ask you to go to Nashville and see him. I can show you a couple of crowns that he put in in 1884 and are still giving good service. That is the point that I want to make, that anybody can put in dental work right if he will only try it. Dr. Harry Lee and I started out making what we call root attachments, but I have quit now, since we have gotten the indirect method. We worked this out together, and he has several bridges put in with inlays giving good satisfaction. But the idea of condemning fixed bridge work because we see two or three cases that are wrong, is all wrong, gentlemen. We are all working on this proposition and if we study and work together I don't see any reason for condemning bridge work because some say that it can't be done properly. If we hunt a specialist, we will find a specialist on any one line of dentistry we want.

Dr. Hubbuch: There was a question of fee raised, and I take the liberty of referring to it again. It only stands to reason that a dentist doing crown and bridge work cannot get results at five and six dollars per tooth, as service rendered and results obtained must necessarily be governed by the fee received to a great extent. If a man consumes only a half hour in making a crown, and charges only for that time, he can't make a profit if the proper making would take an hour and a half at the same price he charged for the half hour. Our fee regulates the kind of work that we perform. Study clubs are much thought of and not very much brought into real use. In our own city a number of us have been thinking of study clubs, but nothing has been done. However, we cannot get away from the fact that when a man is in earnest he will talk these things over with his brother dentist.

Regarding the matter of fixed bridge work: I was very glad to hear Dr. Rose say that fixed bridge work can be made properly, and as I read in my paper that it is a possibility, but we do not carry it out, and therefore my plea is to better it. That removable bridge work is not kept clean in a great many cases, I admit. I admit also that removable bridge work not kept clean is unsanitary bridge work. The trouble is with the patient, not with the dentist. Full dentures are easily kept clean we will all admit, but we see them often return with "mush" all over their dentures to our office. I have often heard it said that there was no place in dentistry for fixed bridges. I believe that they can be fitted and fitted properly and that they can be made to give good service if kept clean.

Dr. Grant: I have a very high regard for Dr. Rose's idea about the matter that he has been incubating, and I feel that we should take some action. It is a fact that we have got to offer the opportunity again and again in order to interest those who ought to become interested at the first suggestion, and if this offers at least only a partially satisfactory method of creating interest I think it would be a good idea to take it up. I therefore move you that the president be authorized to appoint a committee to take this matter up and report on it. (This motion was duly seconded, voted on and carried.)

Dr. Meguiar: I hope you gentlemen will pardon me if I make a little further explanation. The city man and the men outside of the city of Louisville are both concerned; I believe you will get hold of the thing right. This is not solely a city man's proposition. It will help the city man in his specialty and it will help the inland town man as well. Dr. Rose left out the detail—he left the question open to let the discussion bring out the detail. Let those men who live in some of the small towns get up and say something and let us come to some conclusion on the matter. Now, the essential idea of the whole matter is that the small town man is not a specialist but he has patients in his community whom he thinks should receive the attention of a specialist. Now, they could get on the train and go to the city, but they haven't the time. People with pyorrhea, for instance, would be willing to give up a handsome fee if a specialist came down to that office and treated them. While he is doing this, the dentist assists and looks on, and in this way he will learn how the thing is done better than by any post-graduate course. He does not pay for this; the patient is willing to pay. Can't you conceive that if we all get together and talk the thing all over this state that it will help that thing, and instead of you having ten patients in pyorrhea you will have twenty? Why, God so arranged things that no one man could do it all. Patients will go to one dentist because they like him, because he is especially skillful, because he is a sport, because God so arranged that one man couldn't get all the work. Take oral prophylaxis; everybody is talking it. Now are we getting returns from that? To be sure we are. Now if this is put in operation won't it help us? I say, therefore, that it is essentially to the interests of the outside-of-the-city man to push this thing. It is not that the city dentist will get behind this; there is not much for them to get out of it. Let's decide this matter, yes or no.

Dr. Stacy: My mind is rather clouded—I haven't fully made up my mind what I do think of it. I do not like to see an idea like this passed up. I do not think that it is something to be acted on right now as final, but I think we should appoint a committee to take it up. I believe in study clubs. I see that we do not know anything like what we ought to know. I do not think it is enough to teach a man the technic of an operation, and therefore I think the matter of study clubs should be thoroughly considered and how we should promote the study clubs throughout the state. The state might be divided into districts, each district take up some one subject and devote an entire year to that subject, each district taking a different subject. I offer this merely as a suggestion. I think that this question should be referred to a committee rather than take final action now.

Dr. Dorsey: A committee has been appointed. Now, for a committee to work to the best advantage, I don't think that the members on that committee should agree beforehand. The committee that has been appointed has already agreed. I have no criticism for any member of the committee, but just give that to you as a suggestion.

MOUTH FOCI OF INFECTION AS THE PHYSICIAN SEES IT*

BY J. A. FLEXNER, A.M., M.D., LOUISVILLE, KY.

I WANT TO TAKE this opportunity to thank Dr. Randall and his committee for the kind invitation which enables me to be present this evening. I take it as an omen of the very best kind that the profession of dentistry now recognizes itself as one of the medical specialties—that it has all the responsibilities which attach to the separation of a branch from the larger whole. The day is passing—should, in fact, have long since passed—when the teeth and their adnexa were thought beneath notice of any one much above the merest mechanic. The recognition of them as special organs of the human body with a special physiology but not beyond the domain of general pathology, in fact, subject to the same degenerative changes which govern other organs—liable to the attacks of pathogenic micro-organisms and doubtless provided with protective mechanisms as are other organs, brings the entire subject-matter of dental science well within the purview of the practitioner of internal medicine. I have used the words "dental science" advisedly, for with reference to the immediate subject I have a strong feeling that what is passing for dental science in some quarters today will not be thought scientific some years hence. In fact, I have the feeling that dental surgery especially is passing through a phase similar to one which general surgery itself has traversed. Some years ago, I remember with horror the slaughter of viscera, for what was then thought good and sufficient reason, but which would not be sacrificed now by any conscientious or competent surgeon. The discoveries of the X-ray plate—the facts regarding the internal condition of the tooth, as well as its immediate surrounding which the Roentgenologist brings to the physician's attention, are of vital importance to both patient and physician, and surely to the dental operator. The inclusion of these small defects within the larger doctrine of focal infections—infections of low pathogenicity—but of great power of destruction of vital tissues—raises these apical abscesses or other tooth infections into a place of prime importance. It is right here, however, that I feel that our knowledge begins to fail and that the keenest powers of the diagnostician, both dental and general, need be brought to bear.

It is a common enough thing to hear that the various forms of arthritis, the various acute and chronic conditions of the endocardium and pericardium, many myalgias, neuralgias, pernicious and other types of anemia, and many other obscure conditions, are due to faulty dentistry and its accompanying infections. But what steps have been taken to prove this? I believe it is taught that these infections may be of local or hematogenous origin. Are we entirely sure that in many of these cases we have not gotten

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*One of a symposium of papers read at the Kentucky State Dental Society, May, 1917.

"the cart in front of the horse?" I have seen some cases of arthritis and muscular rheumatism undoubtedly relieved by the removal of suppurating teeth. But I have had other cases where the X-ray showed absolutely normal teeth and the most painstaking search failed to find a focal infection.

What right-reasoning person could connect in any casual manner an apical infection which might arise with the pre-existing arthritis? In fact, since the blood stream may carry these micro-organisms, may not a positive chemotaxis of a damaged apex fix the infecting organisms, and the apical infection itself be a result and not a cause? And may I ask right here, what final good can come from sacrificing such teeth? I know full well that the ready answer is that by just that much is an infected area reduced; but I again urge that thus far no accurate knowledge of the type of infection exists and that, leaving the primary focus untouched, is not ideal surgery, not the highest science. Shall the ideal be striven for? In what direction shall our research go? To one who has followed the literature on this subject for the last few years I believe the answer to the first inquiry will not be difficult. I confess that the researches to which I shall presently refer were not only astounding but appaling.

McKisack, in the *British Medical Journal*, 1915, 1-453, reports on the condition of the mouth in 155 cases in the Royal Victoria Hospital, Belfast. Of the whole 155 cases, only nine had what might be called healthy mouths, and the author states that we must recognize the existence of over 90% of unhealthy mouths in the community. From McKisack's table, in chronic gastritis, of 19 cases, there were 2 mouths classed as fair, 7 bad and 10 very bad. The total teeth were 247, with 48% carious. In 10 cases of gastric and duodenal ulcer, there were 1 clean, 6 fair and 3 bad mouths, containing 197 teeth, of which 21% were carious. In 7 cases of rheumatoid arthritis and chronic rheumatism, there were 2 fair, 1 bad and 4 very bad mouths; there were 105 teeth, of which 78% were carious. In acute rheumatism, the difference is noteworthy. In 16 cases there were 3 clean, 3 fair, 6 bad and 4 very bad mouths; there were 341 teeth, of which only 23% were carious. The difference between the so-called rheumatoid arthritis and chronic rheumatism and real acute rheumatism from this point of view is striking. In 4 cases of pernicious anemia, there were 3 bad and 1 very bad, containing only 32 teeth, of which 39% were bad. These cases were over 35 years of age.

In exophthalmic goitre, over 80% of the teeth were carious. In 6 cases of pulmonary and pleural tuberculosis there were only 94 teeth, of which 36% were carious.

In 44 sundry cases, there were 3 clean, 13 fair, 14 bad and 14 very bad mouths, containing in all 801 teeth, of which 26% were carious.

McKisack discusses in detail the association of diseased mouths with the various diseases noted in his table, from which I have made excerpts, and although he recognizes that improvement of the mouth condition is followed by an improvement of the systemic condition, this is not evidence enough to convict the mouth of being causa causans of so many diseases. He states that, like the Scotch verdict, "the guilt of the accused is not proven, but he remains under grave suspicion." I will not go into this splendid contribution further than to say that he states clearly that "caries of the teeth must not be allowed to remain unrepaired," and then goes minutely into the theory and technic of the cause and treatment of pyorrhea alveolaris as well as the apical and other tooth infections.

Dr. Frederick B. Moorhead, of Chicago, reporting on three groups of cases, two of which are from the wards of Presbyterian Hospital, in the service of Dr. Billings, has a very similar tale to tell. Of 498 cases of chronic arthritis, 332 had careful Roentgen-ray study and examination; 1132 periapical infections ranging from small areas of rarefaction to gross bone lesions were recorded; 89% of this group showed chronic alveolar abscess; 1342 teeth were involved in varying degrees of pyorrhea; 76% of the patients had well-defined pyorrhea, many of them well advanced with marked suppuration. A second group of 70 patients, excluding all arthritis, showed chronic alveolar abscess in 74%. The list includes myositis, neuritis, goitre, asthma, nephritics, etc.; 49% had pyorrhea. A third group of 150 private office records showed chronic alveolar abscess in 69%, the richer classes being in these respects but little better off than their poorer brethren. In fact, the readiness with which the poorer classes part with their teeth by extraction has doubtless saved them much trouble along the lines indicated.

In the studies made by Dr. Irons from the material in the Cook County Hospital, there were 124 patients from a ward of 329 who were studied by the X-ray. Of the entire 124, 44% had alveolar abscess. Of the arthritis group, 76% had alveolar abscess, in the nephritics and cardio-vascular diseases, 47%. Of the other diseases, including pneumonias, respiratory, gastrointestinal diseases, 23% or less than one-third of the percentage in the arthritis group.

These figures, which might be multiplied, sufficiently indicate the universality of these infections; the worst of them being undoubtedly the apical infections—the old blind abscess. The well-known surgical law applied here as well as to other parts of the body. Pus or toxin under pressure is far worse then where free drainage takes place. For this reason, and possibly because the organisms involved in pyorrhea are less toxic, the constitutional symptoms attending pyorrhea are less severe as a rule than those of periapical abscess or root infections under pressure.

I am tempted to report here an instance of this kind which came under my observation recently. A very careful and intelligent mother brought her son of ten into my office. The child was manifestly ill. He looked pale and listless, had a very weak and rapid pulse, a temperature of over 102, and his heart sounds were weak, a systolic murmer being heard at the mitral area. His face was swollen slightly, and a pin-point spot of pus showed over one lower bicuspid. No other site of infection was found. I sent him to his dentist at once and had the tooth opened, the filling being removed and the tooth as far as possible cleaned out. The little fellow was then put to bed; the next day the temperature, pulse and the whole thing had cleared up, though still draining slightly.

The bacteriology of these infections has had a great deal of attention and the streptococcus viridans of Schott-Mueller is at least one class of the important mischief-makers which get in their work here. That other organisms are involved must be the case. In our own laboratory we have recently isolated a pure culture of a pneumococcus from an infected molar. This tooth and a buried root of an old wisdom tooth were undoubtedly responsible for an anemia and a host of other symptoms in a young woman here. At the instance of Dr. M. L. Rhein, of New York, and in collaboration with Prof. Hastings, of Columbia, Dr. Pease, of New York, has been engaged in the endeavor to determine a method by which we may answer the question as to whether the streptococcus viridans is the real infective agent in any given case. The bases of the test is the complement fixation method of Bordet and Gengou, which is followed in the Wassermann test for syphilis, or the fixation test for gonorrhœa. In a private communication from Dr. Pease, he goes into the details of this test. I shall not burden you with all the details which Dr. Pease kindly sent me, but when I say that there have been 150 strains of streptococcus viridans isolated, and that as many as possible should be included in the antigen, some idea of the difficulties surrounding this test may be had. The carrying out of the details is again a very highly technical matter, calling for specialists in serological work, and all in all I am of the opinion that, as thus far developed, the test is of limited use.

With the exception of the endamœba buccalis, the other cocci and bacilli seem to me to call for more consideration than they have received. If I am not in error, I believe that the work of Smith and Marshall, etc., on pyorrhea in its relation to the endamœba, is no longer thought valid. Certainly the indiscriminate use of emetin cannot be justified, and I have seen both local and constitutional reactions from it which made me pause in its use.

We do not need go far to become aware of the virulence of the mouth pneumococci when they wander away from their usual habitat, as the following case will show: Some years ago I was asked to see a gentleman of about sixty with a so-called inflammatory rheumatism. Only one knee joint was involved at the time, and no other joint became involved. This knee, however, made up in the intensity of its inflammation and the suffering it caused for any number of other joints. There was a history of an alveolar abscess, to which we did not pay as much attention then as it would receive now. The usual methods of treatment were useless, and at my request Dr. Vance aspirated this joint, drawing off three or four ounces of a thick yellow pus, which gave a pure culture of the pneumococcus, and the pain ceased.

Certainly a very different story from an ordinary rheumatism caused by any of the streptococci.

With the etiology of these infections somewhat in doubt, what am I to say regarding the treatment or the future trend of research which is needed? I do not presume to go far before this audience in the matter of treatment, and yet I may be permitted a word or two in a general way. The ruthless extraction of teeth when the X-ray reveals these apical infections, without other definite symptoms and reasons, has always seemed to me to be excessively severe treatment. Are we sure—your part of the profession and mine, your research workers and ours—that we have not left here an unusually fertile field without cultivation? I confess that the possibility of some form of chemotherapy applicable to these conditions seems to me to offer a tempting opportunity for original research. May I briefly outline the basis for this possibly unjustifiable optimism? The influence of the salicylic acid radical on the streptococcus of rheumatism is well known. In the case of erythema nodosum, which is a form of streptococcus infection with local manifestations, it is easily possible to see the whole process disappear and rapidly with the use of any of the salicylates. The salicylate of sodium has been used successfully and even intravenously and is a safe drug, and here I am tempted to refer to the work of Ehrlich, who, in his salvarsan and its relatives so combined the arsenic that it developed its special affinity for the various spirochætes or trepomemata. The possibility of so combining the salicylic acid radical that its affinity for the viridans group may be enhanced should not be lightly set aside. Again the effect of ethylhydrocuprein or optochin—one of the relatives of quinia—on the pneumococcus group has suggested to me the possible use of this drug in these infections, where the pneumococcus is at fault. In the constitutional infections, even outspoken pneumonias, where one of the pneumococci is the infective agent, this drug has been of great use. Its margin of safety has been worked out and it is ample in careful hands for all therapeutic purposes. The use of emetin in the infections with endamœba has been referred to and with proper precautions may also have its uses. What I wish to emphasize is the need for closer identification of the specific infection and a proper therapy when the diagnosis is once made. I am well aware of the fact that the pathology is not a simple one. Dr. Billings, in the symposium referred to, has beautifully explained and elucidated it, and all the more do I consider it necessary to make a closer diagnosis and to endeavor to fit the treatment to the entire pathological process.

I know that some teeth may be saved by the amputation of the apex. I know some others which are made useless by this procedure and are lost to their owners. I have known of some sad results from what appears to me to be the abuse of these later methods—I mean root amputation and apex removal, and I feel sadly the need of light and information upon these matters. What are the indications and contra-indications for these procedures, or similar ones? When is it wise to try them, or when shall the tooth be sacrificed? Are you ready for a crystallization of opinion and judgment on these matters, and is the judgment an empirical one, or based on pathology and research?

In the discussion of Drs. Moorhead's, Billings' and Irons' papers, Dr. M. L. Rhein spoke of the necessity of educating the dentist more in the fundamental principles underlying medical science. I have just indicated the feeling that it is a great pity that our internists or general practitioners of medicine, the family physicians, are not better taught the principles and practices of dental science. Were this true, how much better and safer counsel might be extended when it was sought or needed. I am sure that I have seen many mouths with expensive gold work in them, that would have been better for their owners if their denture were entirely artificial. But no amount of scientific teaching has ever made men honest, who were not so intuitively, and for such things the science of dentistry is not to be blamed. It takes a rare judgment at times to know, even in the larger field of medicine or surgery, *what not to do.* In our work—your work and mine—it may well be said that "fools rush in where angels fear to tread." Where there is so much yet to be learned, discovered and worked out into daily practice, and where there is so much border territory—now yours, now ours, surely it is not amiss to hope that the growing interdependence of medicine and dentistry may continue to the great benefit of both professions and their joint patients.

948 South Second Street.

THE MOUTH AS A FOCUS OF INFECTION IN SYSTEMIC DISEASE, AS THE ROENTGENOLOGIST SEES IT*

BY D. Y. KEITH, M D., LOUISVILLE, KY.

THE PAST YEAR has brought forth so many conflicting reports from different writers that to us it would seem most confusing to draw conclusions from the literature telling us what the numerous shadows represent in pathology when seen around the apices of teeth. There is no doubt or controversy about the shadow seen, but to say what the pathology any particular shadow represents is where the readers of plates and films begin to vary. The different readings of films is not in the shadows, but in the dentist or Roentgenologist who is making the interpretations. It is our belief that in the future more films will be made of teeth where the clinical and Roentgen diagnosis do not correspond. In doing this, we shall be able to present lesions in suspected areas that have in the past been labeled negative and accepted by the dental practitioner, though the patient continues to suffer.

If it were possible to make a pair of dental films of every tooth at right angles to each other, many infected areas would be presented to you that are now negative. As this is not possible, it is our duty to procure films in at least two different angles where there is positive clinical evidence, and a negative plate or film.

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*One of a symposium of papers on Oral Infection, read before the Kentucky State Dental Society, May, 1917.

A quotation from Dr. Brophy, in July (1916) *Medical Clinics*, after relating an experience in a fractured jaw in which the radiogram was misleading, says: "Now I am convinced that those darkened areas we see on the plate are by no means evidence of an abscess. They are evidence, however, that an abscess once existed, that the bone was destroyed or absorbed by pressure, and that perhaps there was infection of the organic matter of the bone to such an extent that some of the bone itself disintegrated." In some instances we all know a great deal of the bone will become disintegrated and large cavities will be left at the ends of the roots of the teeth; but these large cavities, everything being done to exclude further infection by having the root well defined, will be filled by the new bone.

Many of you gentlemen present who have followed your cases with dental films have seen the regeneration or filling in of new bone after an abscess was well cleaned out. You have also seen cases that the dark spot persisted, although clinically the case was cured. In these cases you were kept in doubt as to the best procedure.

Another point about the dark spots at the roots we want to call attention to is the ease with which the shadow can be transferred to the root of the adjoining tooth either anterior or posterior. This is done by changing the angle of the rays or changing the position of the patient. Recently we had the experience of making two films in the same patient in trying to show the roots of an impacted last molar. In one film one of the molars showed a pulp-stone, the other film was negative. Do not hesitate to make more than one film when not positive of your diagnosis.

Rosenow has proven beyond any doubt the selective action of different bacteria, and all of you are doing work every day where the systemic improvement is conclusive of the good you are doing. He also has proven that in 80 to 90% of the chronic arthritics the primary focus of infection is found in the head, with a goodly number of foci in the teeth. In the cases of arthritis in which you fail, seek, or have some one else seek, for a focus of infection elsewhere, as the involvement of the teeth may be a secondary lesion the same as the joint lesions.

Our observations in gastric and duodenal ulcer have been that a number could have been prevented had proper care of the teeth been instituted in early life. At present, quite brilliant results symptomatically are being obtained in the medicinal treatment of gastric and duodenal ulcer, and the first thing is a thorough examination of the teeth with treatment, if any indication is found from either a clinical or Roentgen examination.

In pyorrhea and apical abscess, which two, with their complications, constitutes the greater percentages of systemic diseases, in which the foci is located in the mouth, is where the Roentgen examination has its widest field of usefulness.

In our opinion we see quite a number of teeth in which efforts have been made to save hopelessly-infected teeth. It is our belief that you have been taught to try to save too many teeth, in view of the systemic diseases that are so prone to appear to endeavor to save a tooth that is hopelessly infected, is subjecting the patient to dangers far in excess of the good to be derived from a few teeth. Those of you who can best judge the teeth as to which should or should not remain, will undoubtedly produce better results and see fewer recurrences than have been seen in the past.

Recently we have seen a number of carcinomas beginning on gums, tongue, internal surface of the cheek, sides of the tongue and the floor of the mouth, which we believe if the cause could be determined, would be traced to the teeth. All of these patients have been men except one and every one possessed the foulest mouth it seemed possible to produce, with numerous ragged teeth in close proximity to the growth, which by constant irritation was a prominent causative factor in the beginning of the tumor. We only mention these as we are sure cases of this character are rarely seen by you dentists. I am certain from the appearance of these mouths no dentist had ever seen any one of the above referred to.

Let us not be discouraged because a few of us differ as to what produces a certain shadow, but broaden ourselves by getting more views of these shadows at different angles, for in this way only you can feel assured we are doing our duty in improving the efficiency and health of our patients.

We trust you will pardon our seeming digression from the title assigned us, but feel we have accomplished more if a discussion on the production of shadows will increase your study of the pathology of the mouth, than to have enumerated a number of conditions and diseases that occur from infections of the teeth, for we are sure you are much more familiar with these than any Roentgenologist.

Atherton Building

DISCUSSION

Dr. Burghard: This is a question that is of much importance to both the dental and medical professions. One of the questions brought up with reference to the periapical infection was whether it was due to primary infection or secondary infection. This is a hard one to decide, due to the difficulty as Dr. Keith states, of securing all pictures at right angles to the tooth so infected. In other words, these abscesses do not always show up on the radiograph. As for the wholesale extraction of teeth, I am very glad to hear a man like Dr. Flexner talk about the conservation of teeth. I think that from what has been done with rarified areas around the apical ends of teeth and proper root-canal work as shown by the radiographs taken that in a great majority of these cases this rarified area will fill up with healthy tissue in the course of six months or a year, and I think that this should be enough to convince us as well as physicians that such conditions don't always call for or require the extraction of the tooth or teeth infected.

Dr. Rounds: I have enjoyed these talks and papers extremely and I am impressed more and more every time I hear a paper on this subject that I know less and less every day. I believe that the dental profession in times past has shown a tendency toward one extreme or another—a sort of a pendulum, I might say. I believe that we are going to reach a happy medium. I believe that the time is coming when we are going to reach a safe and sane basis in extraction of diseased teeth. I believe that many teeth that are sent to the exodontist today are not good foci of infection. In the reading of the radiographs, the point that Dr. Keith brought out of more than one exposure in different positions or angles is, I believe, a very important one. In my opinion only one exposure taken of a case will give you a very imperfect diagnosis. The general systemic involvement of teeth we know definitely is very important consideration for us, but we are apt to go too much—the pendulum is apt to swing too far—to the radical extraction of infected teeth. I believe we should be more careful with our diagnosis and go further into the diagnosis of infection and be sure of our ground before we advise extraction.

Dr. Rose: I have enjoyed the papers very much, and it is a subject that we are studying continuously. There is no doubt in my mind that every disease is caused by some infection. When we have arthritis it is caused by some infection. It is a serious thing to extract all of the teeth of an individual or remove a beautiful bridge and not relieve the arthritis. I have a great many patients referred to me that are suffering with arthritis. The first thing I do is to have their teeth X-rayed. Then I have the patient sent to an eye, ear, nose and throat specialist and have a thorough examination made there, and sometimes we even have a Wasserman test made. If the tonsils are inflamed, we have them removed—every particle of them removed. Now if your X-ray shows that there is a great deal of pus around the root of the tooth, that tooth should be extracted and extracted at once. You can tell by looking at the "pocket" whether that tooth ought to be removed or not. But don't depend always on the X-ray. On one patient at least we found it to be unreliable. In this particular case the patient had a bicuspid tooth that had been crowned for twenty years. The radiograph did not show anything, but owing to the fact that it had been crowned for twenty years, we were suspicious of it and had it extracted. That tooth could have been saved, but we did not think it advisable on account of the patient's physical condition, and when we opened it up and found it infected we extracted it. I want to say in all earnestness both to the dental profession and to the medical profession that unless we go back to our books we will have to go back to the farm.

Dr. Hume: I am especially interested in this subject. I know of a great many cases that have shown great improvement on removing abscessed teeth and this has been brought to my attention forcefully by some physicians in connection with this work, after we had eliminated everything else as being the cause of the trouble. The removal of these teeth oftentimes caused a more rapid recovery of the conditions than could possibly have been otherwise as shown by the history of the case. Make a pal out of the family physician. Ask questions and make it known to him that you don't know all about everything and he will open up and be equally frank with you, and we will be able to get good results in cases where we would otherwise get bad results. I use toxin made from the culture of the abscess itself frequently in this work. I believe that is the only way to get a toxin that will do the work properly. Get it from the patient on whom it is to be used—from his own mouth and from the very tooth that is infected. When you get it this way you know you have a toxin of the various cocci present in the case at hand, otherwise you would not be sure. If we get temporary relief from the extraction of the abscessed tooth, why couldn't we get better results by having the family physician make a toxin and administer it at this time, while we can get it from the very tooth itself?

Dr. Flexner: I am supposed to say a word in reference to vaccine. The stress that is laid upon the use of vaccine is altogether out of proportion to the effect that these things have. I spoke here of the isolation of 150 strains of streptococcus viridans. Now, vaccine to be worth anything must be a specific vaccine. This needs a real laboratory man and a real bacteriologist. Voltair put it about right when he spoke of the medical profession as putting things of which they knew little into human bodies of which they knew less. Dr. Longcope has shown that by the use of these things you may produce myocarditis in animals. As to the use of vaccine, I am a true believer in vaccine when it is specific vaccine. Here we have probably an infection of 150 different germs and we want a specific vaccine. The only way to get a specific vaccine for that particular patient is to get it at that particular time. You might get a germ that so far as the bacteriological test shows is exactly like the one you are after, but it seems to me that we ought to get a vaccine and to know or have knowledge of the specific effect of that vaccine before injecting it. You can take that vaccine, and it does not take much, and inject it into an animal and if you produce arthritis you are sure you have that specific vaccine. As long as you take the bacteria from a secondary focus you are not going to produce the proper effect. The object is to get the culture from the tooth we extracted and go ahead and inject it into a pig, for instance, and if you get your effect you may be sure that you have the proper one. The laboratory work should be done by an experienced laboratory man.

Dr. Rose spoke about the Wasserman test. I am in the office of a laboratory man here and am familiar with this test, and I want to say to you that from what he tells me that you had better rely on the Wasserman test. If you have your test made by a laboratory man who is well posted, I am sure that it is good to rely upon. If you get one positive, nearly all others are always positive.

In regard to finding infections by elimination, eighty-five to ninety per cent. of infections come from the head. Most of these are in the sinuses. By referring the case to an eye, ear, nose and throat man, and have him X-ray the sinuses, you will find the point of infection in a great many cases—I mean the ethmoid, sphenoid, etc., sinuses.

Dr Tileston: I haven't much more to say. I want to refer to the conservation of teeth. The statement that is often made by physicians and some dentists that no pulpless tooth must be left in the mouth, it does not necessarily follow that pulpless teeth are a point of infection always. While it is not possible to fill all canals properly, as pointed out by Dr. von Beust, nature helps us here, that is that we may have the formation of cementum over the apex, and in cases where the infection has not gotten beyond the apex of the tooth I have no doubt that automatic sealing does take place and seals it better than we could seal it.

ORAL FOCI OF INFECTION AS THE GENERAL DENTAL PRACTITIONER SEES IT*

BY H. B. TILESTON, D.D.S., LOUISVILLE, KY.

The question of the influence of focal infections about the teeth upon certain systemic diseases, or the likelihood that such foci may be primary etiological factors in many local infections quite remote from the teeth, as viewed by the dentist, cannot differ substantially from the viewpoint of the medical practitioner and the radiologist.

I use the term "question" advisedly, because the problem is by no means fully solved, and yet, in the light of the revelations of the X-ray, followed up by the bacteriological research by such men as Rosenow, Hartzell, Gilmer, Fischer, Mayo and many others, as well as the clinical findings of hundreds of dentists, physicians and radiologists in collaboration, it would be folly and an evidence of gross ignorance for the dentist to assume an attitude of antagonism to the general proposition. But there are grounds for protest.

The whole training of the dentist has been in the direction of conservation of teeth and the skill he has developed in handling conditions not at all new to him, though some of his operations illuminated by the X-ray may be rather disconcerting, naturally prompts him to dissent from the wholesale extraction of teeth on suspicion, and frequently without sufficient justification. He also quite naturally, if he has maintained his own equilibrium, deprecates the hysteria that pervaded many medical and some dental practitioners as well, which attributes a dental origin to every ill for which no other cause can be found.

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*One of a symposium of papers on Oral Infection, read before the Kentucky State Dental Society, May, 1917.

Numerous cases in practice have been cited in medical and dental literature which apparently prove conclusively that the extraction of teeth about whose root apices rarified areas have been shown by the X-ray, has been followed by prompt recovery from nephritis, arthritis, myo- and endocarditis, and many other toxic conditions.

There can practically be no doubt of the accuracy of these observations, but does that necessarily prove that the teeth were the primary cause of such lesions? Is it not possible that an arthritic infection in the knee, for instance, might, through the blood stream, find favorable lodgment about the apex of a tooth root containing septic material and set up an abscess, thus reversing the proposition? In such case the arthritis would be aggravated by this additional focus of infection without being primarily caused by it. If the tooth were extracted, the arthritis would probably be temporarily relieved, only to flare up again at another time.

Every rarification of tissue about root ends as shown by the X-ray is not to be interpreted as indication of an abscess or the presence of granuloma. It may be due in some instances to the presence of healthy granulations not fully generated, filling in a cavity formerly occupied by diseased tissue which has been successfully eradicated by curettment or other means.

Such appearance is noted for a long time in the area from which a root end has been amputated, the rarification growing progressively less and less, as will be distinctly shown in radiographs taken at intervals.

Since the dentist has records of these and other conditions and because of his familiarity with the dental organs and their lesions, and his knowledge of what may be attempted in the way of successful treatment, he should in all cases be called into consultation and in deciding the question of extraction, his opinion should have the greatest weight.

India's New Wheat Crop

The total wheat acreage in India now reported is 32,962,000 acres, as compared with 30,128,000 acres (revised figure) at this time last year, or an increase of nine per cent. The total yield is estimated at 9,929,000 tons, as against 8,501,000 tons (revised figure), or an increase of seventeen per cent.

LABORATORY MEDICAL ADVANCES OF INTEREST TO DENTISTRY*

BY R. B. H. GRADWOHL, M.D., ST. LOUIS, MO.

DIRECTOR OF THE GRADWOHL BIOLOGICAL LABORATORIES AND THE PASTEUR INSTITUTE OF ST. LOUIS

THE SUBJECT which I have the honor of presenting to this society this evening is indeed a wide-sweeping one, for so intimately is the practice of your profession bound up with that of medicine, that a catalog of the *entire* epoch-making advance of scientific medicine (insofar as the laboratory is concerned) that has occurred in the past two decades would not be amiss. Time forbids, however, an entire recapitulation of this wealth of material. I shall therefore try to lay before you the questions which have been most acutely interesting to me in my work. If I omit such topics that some of you may naturally wish to hear discussed, you will please pardon the omission for the reason already stated.

There are some phases of modern syphilology which the practicing dentist might wish to hear expounded. You will recall that our knowledge of this age-old disease was immeasurably increased only in the last few years by reason of three most important discoveries: First, the discovery by Schaudinn and Eric Hoffman, in 1904, of the spirochæte pallida as the true microbic cause of this disease; secondly, the discovery by Wassermann, Neisser and Bruck, in 1906, of the sero-biological phenomenon known as the Wassermann reaction—a phenomenon of complement fixation by means of which the disease often may be recognized; thirdly, in the announcement by Ehrlich and Hata, in 1909, of the results of treatment of syphilis with arsenobenzol or salvarsan, or "606," as it is variously termed.

These three discoveries which followed each other with great rapidity, completely overturned some of our preconceived notions about this disease, as to diagnosis, prognosis and treatment. I shall discuss first the significance of the discovery of the spirochæte pallida in its bearing upon diagnosis. This is a spiral-shaped organism gifted with remarkable powers of independent motion, which is found constantly present in the primary lesion of syphilis whether it be located upon the genitals, or upon any other part of the body. It also has been found present in the manifestations of secondary and so-called tertiary syphilis. It has even been demonstrated in the tissues of the central nervous system, both in the brain and spinal cord. It has been found in the walls of the blood vessels of various parts of the body; it has been shown in the circulating blood by animal inoculation. It has been shown by Uhlenhuth and Mulzer in the semen of florid eruptive cases.

Of particular importance to you as dentists is the fact that these spirochætes are very numerous in the lesions of this disease that are located within the buccal cavity, notably upon the surfaces of the so-called mucous patches. Mucous patches may be found upon any mucous membrane. It must also be remembered that the spirochæte may be found in the nasal mucus from a case of congenital syphilis, therefore the contagiousness of these cases must not be overlooked by you. The activity and power of resistance to drying of the spirochæte outside the body is quite marked, so that instruments contaminated with these organisms need effective sterilization at all times. Of all lesions of syphilis it has been computed that those affecting the buccal cavity apparently shed off more spirochætes than any other. I shall demonstrate in a few minutes these spirochætes with the so-called dark field illuminator, which means an optical apparatus especially designed to show very minute and colorless organisms. This method is considered the best, far surpassing the ordinary and special methods of staining. I shall not take up your time with a differential talk upon the spirochæte pallida and other spirochætes except to say that there are two spirochætes commonly found in the mouth which are not considered pathogenic, and which closely resemble the true spirochæte of syphilis; I refer to the spirochæte micro-dentium and the spirochæte macro-dentium. The former bears a startling resemblance to the spirochæte pallida; it is impossible to absolutely differentiate them except by cultural characteristics. This has been worked out very well by Noguchi, who showed that the micro-dentium and the macro-dentium both give off odors in the culture tubes, whereas the pallida does not.

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*Read before the St. Louis Society of Dental Science.

You are naturally interested in knowing exactly how syphilis may affect the buccal cavity. First, there may be an extra-genital chancre located here, either upon the lips, upon the gums or any other part of the mouth. Naturally these lesions will develop many spirochætes and cause great danger to those who come in contact with these secretions. The lesions of secondary syphilis are called "placques muqueses," or mucous patches. They are of a characteristic appearance, appearing as if they had been glazed, or covered with a diphtheroid exudate, their surfaces being erosive, papulo-erosive, fissured, ulcerative or vegetating. Materials ingested by syphilitics which cause buccal irritation are liable to produce these lesions, namely, tobacco, the use of irritants, drinks, alcoholic beverages, etc., all of which explains their more common occurrence in the male than the female. They may be labial, jugal, gingival, lingual or palatine. They may be seen only at the commissures, the internal face of the lips, often disposed as would be the pages of a book. They must, therefore, be sharply looked for in order not to be overlooked. Upon the tongue the fissured type may predominate and they may heal with the formation of a leucoplacia or white spot. In general they can be easily differentiated from the lesions of aphthous stomatitis by the fact that the latter have a punched-out appearance, with sharp edges, while the "placque muqueuse" is irregular, not punched-out, but usually raised above the surface. I mentioned these lesions at length because of all manifestations of syphilis the mucous patch is the most dangerous because of the vast numbers of spirochætes which they give forth. The vast number of drinking-cup and kissing infections usually are initiated from a careless individual with an infectious mucous patch. There are also tertiary lesions that are found upon the lips, tongue and tonsils, but they are not nearly so frequent as the secondary manifestations. However, each one of these tertiary or gummatous lesions may be highly infectious by reason of their spirochætal content. The tertiary lesions about the mouth may be in the form of interstitial infiltration, gummata or tubercles.

The discovery of the Wassermann test marked another wonderful advance in diagnosis of this disease. Briefly, this is a method of determination of the presence of syphilis by means of a blood test. Advantage was taken by Wassermann and his co-workers of the biological phenomenon previously described by Bordet and Gengou, namely, that specific cells are hemolysed in the presence of complement by a specific or homologous amboceptor, and by reason of the fact that this hemolysis can be prevented by adding to this system a specific antibody and an extract derived from a preparation of the same micro-organisms that have produced this specific antibody. For example, if we inject a rabbit with sheep cells, the rabbit develops a specific amboceptor; that is, if some of this rabbit's serum is placed in contact with the sheep cells, hemolysis or digestion of these cells occurs. If the serum is previously heated, no hemolysis occurs because by this heating you have destroyed a third element of fusion, called "complement." If now to this heated-blood serum you add some fresh guinea-pig serum which contains a good deal of this complement, hemolysis quickly occurs. Wassermann proved that if you take a syphilitic blood serum and an organ extract, syphilitic preferably, and add this mixture to the "complement," the complement is bound or fixed so that later when we add the amboceptor and the sheep cells, no hemolysis occurs. This is known as a positive reaction. If the patient's blood serum is normal, the complement is not bound or fixed. It remains free to hemolyse the sheep cells which are later added; here occurs then a negative reaction. While Wassermann maintained originally that this test was a true antigen-antibody reaction such as has been seen in many other infectious diseases, it is now proven that while the test is specific, it is not a true reaction in the sense that we must use an extract of organs containing the spirochæte pallida; good and efficient antigens may be made from normal organs and even from solutions of inert chemicals.

I shall demonstrate here the phenomenon of hemolysis upon which the performance of the Wassermann test depends. The art of the test is dependent for accurate results upon the use of exact quantities of reagents carefully titrated each day. It has been found that this reaction while present in a goodly number of cases of syphilis, is not constantly positive even though the individual is syphilitic. The error is due to certain flaws inherent in the manner of performance of the test. First, in the Wassermann test it is necessary to heat the patient's serum at 56 degrees C. for half an hour for the purpose of destruction of the natural complement present. This heating, while destroying this complement, also destroys part of the syphilitic antibody; if there is a small amount of this antibody present, the test will subsequently come out negatively, even though it was syphilitic blood. Again, there are numerous individuals with so-called natural anti-sheep amboceptor present in their blood, due to the ingestion of mutton supposedly. An excess of this substance in the actual Wassermann test results in a negative reaction, where a positive would have been obtained had the proper amount of amboceptor been added. Acting upon a suggestion received by observation of a test devised by Hecht and Weinberg to obviate these flaws, the writer devised a method of eliminating these factors or errors in the Wassermann test, a test which for the sake of brevity has been called the Hecht-Gradwohl test. It is performed with the use of unheated sera and with the utilization of the natural complement and amboceptor found in ninety-eight per cent. of all bloods submitted for examination. By means of this test we are able to add to the column of positives at least twenty to twenty-five per cent., based upon over ten thousand comparative tests.

By means of these two tests, therefore, we are at present able to run down many cases of occult syphilis which otherwise would escape detection. I shall now come to the third great discovery and discuss it very briefly, namely, the use of salvarsan. Controversy still rages about this wonderful drug, but I shall try to give you an opinion of its merits based upon a composite conservative opinion of numerous American investigators. It quickly heals and renders innocuous for further contagion all outward evidences of this disease. It renders mucous patches non-virulent within twenty-four hours. It rapidly restores sloughing and ulcerative areas. It heals gummatous lesions as if by magic. Does it cure syphilis? It was the original hope of Ehrlich that its use would be followed by cure, that it would actually produce a *therapia sterilisans magna* by one or more injections, just as it experimentally did in the lower animals when used in association with other spirochætal diseases. It has been found in actual practice that no assurance can be given in advance as to the curability or noncurability of any given case of syphilis by means of an arbitrary number of injections of salvarsan. We have reason to believe that the use of this drug early in the primary stage, by frequent repeated doses, may cut short or abort the disease. We have reason to believe that the use of salvarsan with or without the use of mercury, has cured cases of secondary syphilis. To define a "cure of syphilis" is difficult; it must mean repeated negative Wassermann tests; it must mean the ability to bring forth healthy progeny, with negative Wassermann tests of the blood of child and mother; it must mean—and this is the most eloquent proof of all—the capacity or disposition to become reinfected with the same disease. All of these conditions have been fulfilled with respect to this remedy and this disease, in certain cases, but there is no warrant for stating to any one case that such results will mathematically accrue. Each case of syphilis must be treated individually and the prognosis must be made in retrospect and not in advance. Great caution should be exercised with these infected people in giving them definite hope of cure in advance, for we cannot tell except from repeated observation in each case just what constitutes a cure. By cure we must have repeated negative Wassermann reactions, we must have a negative reaction in the spinal fluid obtained by lumbar puncture. We must have a so-called negative provocative reaction by which we mean this: If an individual who has been treated for syphilis and is still uncured, but shows a negative Wassermann, is given a dose of salvarsan intravenously, within a short time thereafter his blood will show a positive. In other words, the use of this medicament has caused the antibodies which still exist to flare up or show themselves. All in all, we can say of salvarsan that it has been of great helpfulness to us in handling this disease, that it has accomplished effects which were never before accomplished with mercury, that it has caused an improvement in treatment far beyond description; whether it has given us a scientific "cure" in all cases, of course, is a question easily answered by the negative. It has helped us in selected cases where treatment has been instituted early, to remove from syphilis the sharpest sting, its most dreadful aspect, the uncertainty of cure. By intensive usage, in early primary case, there is great promise of cure. By its use in syphilis of the spinal cord and certain aspects of cerebral syphilis, the results obtained have far exceeded those of the past. I refer more particularly to the use of salvarsanized serum or patient's serum containing salvarsan, injected intra-spinally.

Leaving this disease for the present, let us discuss as briefly as possible that other dread foe of humanity, tuberculosis. Tuberculosis and syphilis, the great White Plague and the great Red Plague, what dreaded foes of humanity have we in these two! Eliminate the ravages and woe that are left in the trails of these two arch enemies of modern man and you will have a world comparatively free from misery caused by disease. Tuberculosis is of interest to members of the dental profession, first, because these subjects need your attention in general as much as others; second, because it has been proven that many of the symptoms found in tuberculosis subjects are due to disturbances in and about the teeth, disturbances which if left unrecognized will keep the tuberculosis subject in a very bad condition and prevent him from obtaining the fullest measure of success from sanatorium or other treatment. In a very excellent consideration of this subject appearing in the Transactions of the National Association for the Prevention of Tuberculosis, for 1916, D. R. Lyman calls especial attention to this important question. He details several case histories where tuberculous patients were running very irregular fevers in spite of rest and other helpful forms of treatment, without any change until he was struck by the poor condition of the teeth. Prompt dental treatment was followed by a drop in the temperature and a rapid change for the better in the patients' conditions. It is now accepted as a very important part of the sanatorium treatment that a fully-equipped dental office should be maintained with a dentist always in attendance to take care of such cases. In other words, no good results may be obtained in these cases unless the teeth are properly treated as well as the lungs and general system. Aside from the importance of this phase of the modern treatment of tuberculosis, it must be remembered that we now have measures of early diagnosis in this disease that may interest you. We now have a reliable method of making an early diagnosis of tuberculosis even before well-marked physical signs appear, before X-ray findings will reveal the pulmonary condition, even before tubercle bacilli appear in the sputum. I refer to the tuberculosis complement fixation test in the blood serum. This is a test that in all respects resembles the Wassermann test for syphilis. It is fairly constantly present very early in this infection. The test is made in the same manner as is the Wassermann, except that this being a true antigen-antibody reaction, we utilize extracts of the tubercle bacillus in making the test. There are various methods originated, each varying but slightly, notably utilizing the antigens of Craig, of Bronfenbrenner, of Besredka, of Miller and of Petroff. The speaker has been working more particularly with the antigens of Miller and of Petroff, and is able to confirm in all particulars the results of these investigators. I regard this as a great step forward in diagnosis. The older method of laboratory diagnosis by searching for tubercle bacilli in sputum, of course, is not to be abandoned; this new test is simply an addition to the laboratory diagnostic armamentarium.

I wish to conclude this discourse by referring to the subject of endocrinology and dentistry, truly a most fascinating study. The study of the internal secretions has been of great practical importance to the practicing physician. The subject of endocrinology has long since passed the experimental stage, and is now fully accepted as part of practical therapeutics. The work upon the ductless glands and their secretions was initiated in 1849, when Berthold first hinted at their significance. Later Claude Bernard laid the real foundation for this science. Some twenty years ago the use of organo-extracts began with the publications of Brown-Sequard, of Paris. Many facts have been since elicited. A recent publication by Kaplan, of the Neurologic Institute of New York, voicing the theories of Fraenkel, discusses at length the endocrine interpretation of the dental apparatus. While all his conclusions have not been substantiated, still a number of points in his compilation are important enough to bear repetition here before a body of scientific dental investigators. Waller, of Birmingham, Eng., has very definitely associated the teeth in children with the thyroid gland. These glands play a role not only in the structural but also in the physio-chemical economy. We know that calcium metabolism is governed chiefly by the thyroids. The alkalinity of the saliva depends upon the calcium salt contents. A disturbed endocrine equilibrium may bring about dental decay by a disturbance in the calcium metabolism, particularly in children. The calcium being deficient, the acids from food decomposition are not neutralized and the dentin suffers. If the thyroid is not performing properly, the first tooth to suffer, according to Kaplan, is the molar. The submaxillary saliva is richer in calcium than the parotid and in view of the fact that the molars lie behind the duct, the supply of immunizing saliva is less than for the front teeth, and hence, in calcium deficiency, they suffer first. There is a longer life of the lower teeth than the upper because the lower enjoy the calcium supply longer. This is illustrated by the woman with repeated pregnancies who has an exhausted thyroid and who invariably loses her upper incisors. Children and married women with deficient thyroid function have so-called "thyroid" teeth, slender in frame, thinner than others, more transparent and graceful. The use of timely doses of thyroid in such people markedly helps these thyroid teeth. It is also claimed that in the endocrinous anomoly known as pituitarism, there may be an increased or a diminished size to various parts of the body; this applies to the teeth as well. Hyperpituitarism may be accompanied by large, square teeth, and hypopituitarism may show pigmy dental conditions. There may be an explanation of dental separation from disturbance in the pituitary gland and, on the other hand, hypophysial activity may produce overcrowding of the teeth. The upper incisors carry, then, a message from the pituitary as well as the thyroids. It is also claimed that the gonad or individual with disturbance in the internal secretion of the testes or ovaries, shows an anomoly in his lateral upper incisors, namely, gonads, which are teratologically definitely abnormal, show some abnormality in these teeth. It is important to determine this point, according to the endocrinologist, because we know that the gonad is helped by adrenal substance. Another curious ear-mark is the long, sharp canine which goes with other alterations in the structure of the body, namely, the masculine hand in the female, the moustached lip, the deficient gonadont. Therefore the sexual psychopath might be detected by a study of the teeth and the proper gland extract might be given to help the disordered mental make-up. It is also claimed that individuals with short, dumpy and dull canines lack aggressiveness. Kaplan says: "Such an individual sings high notes, never a basso; he is effeminate, is afraid to fire a gun, and in business is equally nonprogressive. The eternal clerk, messenger boy, cook and other similar occupations are theirs." These and other claims are being made by the endocrinologist. It has been stated that recently a neurologist has been appointed at the Forsyth Dental Infirmary in Boston, whose work will be particularly directed to the influence of the ductless glands on the growth of children. Much good undoubtedly will be accomplished by dentist and endocrinologist studying these questions together.

I cannot close without alluding briefly to the subject of focal infection which has had so much of the attention of dentists and physicians alike. The work of Rosenow has indeed been epoch-making and deserves much more extended treatment than space permits me to give it this evening. It is sufficient to call attention here to the fact that there is a mutability in streptococci; secondly that it has been absolutely established that the portals of entry of these microbic offenders are in the following order:

1. The faucial tonsils and tissue surrounding them.
2. The gums and the alveolar processes.
3. The sinuses of the head.
4. Bronchiectatic and lung cavities.
5. Chronic gastric and intestinal ulcers.
6. Chronic appendicitis producing cardio-vascular damage.
7. Cholecystitis and cholangitis.
8. Infections of the urinary tract.
9. Infections of the genital tract, particularly the prostate and the Fallopian tubes.
10. Local septic submucous and subcutaneous foci anywhere.

The systemic or remote effects are: Chronic arthritis; nephritis, acute and chronic; cardio-vascular degeneration; chronic neuritis and myalgias or myositis. By means of thorough searching we are now able to place our finger upon these focal points. The use of Roentgenograms, the application of dental surgery frequently is followed by rapid relief. The use of autogenous vaccines made from the organisms from these focal points seems at times to afford splendid help in ridding the patient of his chronic infection.

This discourse necessarily covers so wide a field that I trust that I may be forgiven for so hastily recapitulating so many topics, each one of which deserves most careful and extended discussion.

ORAL FOCAL INFECTIONS*

BY EARL BROOKS, D.D.S., NOBLESVILLE, IND.

IT IS indeed a great pleasure to appear before this society at this time, when the tendency of the medical and dental professions to get together in the common cause of saving life is getting into full swing. A few years ago when Dr. Hunter assailed dentistry, his arraignment was resented by many of the profession; yet it was food for thought and immediately investigations and research began. Later when Dr. Mayo said that the next great step in preventive medicine must come from dentistry, it added zest and renewed activity to the subject. The culmination of these, along with some other similar statements was the formation of the Research Department of the National Dental Association, which has, indeed, been a godsend to dentistry and humanity.

Focal infection has for some time been a recognized principle in medicine. Renewed activity and research bring out new locations of foci, but never changes the underlying principle of focal infection. Men such as Rosenow and Billings most effectively brought this to the attention of the medical profession. Foci may be located in various parts of the body; yet those located in the tonsils, nasal and oral cavities and accessory sinuses are much more frequent than those in all other locations, probably owing to the rich flora that naturally exists in these areas. Of these locations the oral cavity is the latest to receive attention and research; which research is showing it to be equally if not of greater importance than any or all the remaining.

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*Read before the Ninth Councillor District Medical Society of Indiana.

Dental oral foci may be classed in three general divisions. The relative importance and end results are quite similar and equal. They only vary in difference of their frequency of occurrence. They are as follows:

First: Foci surrounding the teeth, beginning at the gingivæ.
Second: Foci surrounding the teeth, beginning at the apices.
Third: Obscure foci.

The first two appear about equal in frequency. We shall take these up and consider them separately.

First The foci surrounding the teeth, beginning at the gingivæ. The tooth is set in the alveolar process, supported by the connective tissue in the peridental membrane, running from the cementum of the root to the periosteum of the alveolus. The union of the tooth, peridental membrane, alveolus and mucous membrane of the mouth are very favorable locations and conditions for infection to be admitted.

The teeth and gums, except in extreme cases of cleanliness, are covered more or less with bacteria. Many varieties are present and numerous strains of each variety can be isolated. I shall attempt to name only a few that are quite constant in their presence. They are: Fusiform bacillus, spirochæte, leptothrix, endamœba bucallis, staphylococci and streptococci. These and particularly the last, with many others in the mouth, produce toxins and enzymes that irritate the delicate tissues, and are the beginning of inflammation, particularly in the gingival region.

The root is frequently covered by a calcareous deposit, which in itself is an irritant. The gums become sore and swollen. The inflammation progresses to a point where the tissues break down and admit bacteria, and pus is formed in great abundance. The overflow pus, or that portion not absorbed by the soft tissues, exudes from beneath the gums and is continually swallowed. From this point on the ravages of the invading forces is rapid and very destructive. This is so-called pyorrhea.

The disintegration soon progresses down the peridental membrane, leaving a pocket. Here is where the amœba gets in his work, acting as a host and common carrier for all the bacteria in the neighborhood, transporting them to the bottom of the trenches where they can work undisturbed. Here is where the emetin treatment does good in destroying the amœba; but don't lose sight of the fact that it is not a cure—only a help. When all the amœba are destroyed, the course of the disease is only slowed down, but not stopped.

This condition left undisturbed, continues rootward until all the tissue supporting the tooth, both hard and soft, is disintegrated, and eventually the tooth is lost. Hartzell has called attention to the fact that measuring the distance around each tooth at the neck and adding them all together, gives a length approximately thirty inches. Now, if pyorrhea has progressed to, say one-eighth inch rootward on all the teeth, we would have an ulcerating surface of three and three-quarters square inches. Would such a focal infection excite you in some other location in the body? Then, why not in the mouth? This condition left undisturbed never gets better, but continually grows worse. So much for the diagnosis. What is the prognosis? It is not so encouraging, yet it is not always hopeless. The ravages of this disintegration generally can be stopped at a given point, the irritated peridental membrane will readily tone up and come back, but will not reconstruct if environment and conditions are not radically changed. The lost tissue gives greater mobility to the tooth, which is then a mechanical irritant to the surrounding tissue.

The treatment consists of removing all the forms of irritants and infection surrounding the tooth and highly polishing the surfaces, eradicating the pockets and getting the gums back to their normal tone. If the case has progressed to such a state that this cannot be accomplished, then extraction is very necessary to eliminate the focal infection. The technic of scaling and treatment would not be of interest in this discussion.

The second division, that of foci surrounding the teeth, beginning at the apices of the roots, have their origin in various ways. The pulp of a tooth may become irritated and die of infection from a cavity in the crown. The apical foramen, or foraminæ, for they are frequently plural, gives access to the apical area and readily transmits infection to the tissue beyond the apex and an abscess is then in the making. It may be introduced there during pulp extirpation, it may be due to faulty root-canal fillings, it may be a secondary lesion caused by some primary focus located in some distant part of the body, or it may be transmitted through the peridental membrane from a pyorrhea pocket.

The structure of the canal is such as to make it impossible for granulations to fill the canal; hence the open canal is an ideal culture tube, with one end opening into the soft tissue at the apex of the root. In whatever way it may be caused, we have an abscess at the root apex. It may be acute, chronic, blind or sub-acute. Acute abscesses while they last are to be reckoned with as focal infections; yet as long as neither ostitis or necrosis has developed, the prognosis is very good; they will usually yield to medication or ionization. In chronic or sub-acute abscesses, the prognosis is very poor if treated either by medication or ionization. The soft tissues in such cases are disintegrated and even the osseous structure adjacent to the apex has suffered from the ravages of ostitis usually, and occasionally form necrosis. Either a granuloma or cyst is formed by nature in an attempt to wall off the invading bacterium, but such structures become so highly organized and have their independent blood supply that they become in themselves a menace.

Frequently a chronic abscess has a fistula leading out through the alveolar plate and gum. When it does not, the abscess is usually spoken of as a blind abscess, and in such an abscess the entire incubated culture and toxins are absorbed directly into the circulation. The treatment in either the chronic, blind or sub-acute abscesses must be radical, and by that I mean surgical.

The tooth must be extracted and the crypt thoroughly curetted or the apex resected as far down as the peridental membrane has disintegrated, and the granuloma dissected out and the crypt thoroughly curetted. This latter operation has been the means of not only eradicating the focal infection, but of conserving the tooth, and is a boon to the patient, especially when such foci are located in the anterior part of the mouth, where this operation is especially indicated.

This class of foci are no more important than the others; yet they sometimes appear so inasmuch as the person harbors them without any apparent local symptoms, and it is frequently difficult to convince the victims that they have a dangerous focal infection at the apex of a comfortable tooth. Thanks to the use of the X-ray in such cases, we can see the condition of the root end and the extent of the abscess, and definitely locate foci that otherwise might send the sufferer to an unnecessary grave.

The third division, or obscure foci, usually can be located only by the use of the X-ray. They include coronal abscesses surrounding impacted teeth, especially the wisdom teeth. They may be located around spiculæ of root left in a former extraction, or a well-organized granuloma that was not removed during extraction. They may also be spiculæ of process left from extraction, unerupted supernumerary teeth, or ill-fitting crowns or bridges, or overhanging fillings under the free margin of gum.

It is interesting to note what X-ray investigations have brought to light concerning the frequency of occurrence of dental abscesses or foci of infection in teeth with purposely devitalized pulps, and teeth with dead pulps which have had no attention. Dr. Ulrich reports that in 387 cases where Roentgenographic films of the jaws were available, there were 806 devitalized teeth of which 736 had root abscesses. Of this number 545 had blind abscesses. After studying many similar statements it appealed to me that the percentage was too great, and in order to satisfy myself I determined to compile statistics from my own practice.

In the past year I have examined 110 mouths with the X-ray for foci located at root ends. In most of these mouths I only partially radiographed the mouths. Had I radiographed the entire mouth in each case the results, I fear, would have been still more appalling. However, in these 110 cases I located 295 dead teeth, and of this number 189 were abscessed; or in other words, of the dead teeth I examined within the last year, 64% harbored primary foci.

Of the various organisms I named, the first four, that of fusiform bacillus, spirochæte, leptothrix and endomœba buccalis, which are continuously found in the mouth, have no marked pathogenic significance. The staphylococcus possibly is of more significance, yet the varieties of this class most commonly found in the mouth are the non-liquifying white staphylococcus, which is generally considered non-pathogenic. The other forms are occasionally found and metastatic infections probably occur, yet research along this line is quite incomplete; however, the clinical importance of staphylococci is not nearly so great as the last named group, that of streptococci.

I determined to make a little investigation of my own along this line to see which form occurred most often. I recently made cultures on agar from ten cases, taken at random from my practice and had them examined microscopically by the state laboratory, with the following results:

Four cases pure culture, streptococci.
Three cases pure culture, staphylococci.
Two cases streptococci and staphylococci.
One case diplococci and diphtheria bacilli.

The elective affinity of the various strains of streptococci is of vital interest to those interested in the study of focal infections. Animal inoculation of streptococcus taken from oral focal infections where the patient suffered from certain secondary lesions generally produce the same corresponding secondary lesions in the animal, showing that certain strains produce certain lesions. Recent investigations of Rosenow show the possibility of the strain changing under certain cultural conditions and oxygen tension to another strain. He even demonstrated that streptococcus would change to diplococci and vice versa. All this makes the primary foci more a menace to good health and emphasizes the necessity for it to be eradicated, regardless of the secondary effect being present or not having yet appeared.

Case histories are tiresome to listen to, and for our purpose I have carefully compiled some statistics from seventy-five case reports, as reported in our literature. Most of these were under the observation of men in the research department and all of them hospital cases. In these cases no primary focal infection other than apical abscesses and pyorrhea or their combination were present:

Cases, 75.	Alveolar abscesses	60	Meningitis	1
Primary foci	Pyorrhea	43	Tic douloureux	1
	Rheumatism	8	Pleurisy	1
	Arthritis	31		
	Heart Lesions	31		
	Nephritis	14		
Secondary complications	Arterio-sclerosis	12		
	Anemia	28		
	Exophtgalmic Goitre	3		
	Peptic Ulcer	14		
	Neuritis	2		
	Neuresthenia	2		

In all these cases the complete eradication of the primary oral foci effected either a marked improvement or cure.

In conclusion I wish to say there is the necessity of the medical and dental professions getting closer together upon this subject. The medical profession must wake up to the importance of focal infection located in the mouth. They should ever be on the alert in urging and educating their patients to the necessity of mouth hygiene, which will prevent pyorrhea and the necessity of dental work before pulps are involved, which will prevent abscesses. These conditions are far easier to prevent than cure. When their presence is suspected, however, the physician should by all means demand their eradication. The dental profession should be ever on the alert in the same educational movement to prevent the formation of oral foci, yet when they are present, they should not hesitate to locate and radically remove the same.

PRESIDENT'S ADDRESS*

BY ROBERT F. CANINE, D.D.S., LOUISVILLE, KY.

I WANT TO THANK you for the pleasure of delivering this address to you, as your president, an honor which I deeply appreciate.

These are epoch-making times, times far different from those of our forefathers. In the past, the hand drill, non-cohesive gold, porcelain furnace, and a considerable degree of mechanical skill comprised the dentist's outfit. In those days dentistry was practiced for the relief of pain. The few dentures made were constructed for appearance more than from a health standpoint. With the advent of dental societies, colleges and the bonding together by journals and component societies, plus the aid given by modern appliances of all descriptions, the dentist has grown. He now studies diseases and their causes by the aid of the microscope, X-ray and cultures on the lower animals, and tries to use his knowledge to find a cure.

During the Civil war soldiers were required to have good anterior teeth, not for looks, but to bite the end of the cartridge; the present war also requires its men to have good teeth, but now we realize that their usefulness is in keeping up a man's efficiency through masticating foods and keeping the body nourished under adverse conditions.

This knowledge is being spread to the laity and many of the foremost institutions of our land today have a complete dental outfit for the benefit of the employes.

The dentist is not looked upon as a tooth carpenter any more, for he is far above that. Remote lesions of the heart, walls of arteries and the articular structures are traced to diseased teeth, and the physician calls in the dentist for aid and consultation. This has helped to elevate the dental surgeon's calling and he is looked upon with favor by the laity.

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*Read before the Kentucky State Dental Society, May, 1917.

The National Research Commission, of which you are all members, has been the means of sending this knowledge broadcast and it alone has been the means of educating physicians as to the help a dentist may render them. The meeting of this society annually is a wonderful event, or should be, in each dentist's life. It should be an incentive to come and to receive new ideas, carry them home, and profit by them. Also it is the means of meeting friends from year to year; and now, that we have progressive component societies working together in different parts of the state, the state meeting becomes the sum total of these, and at this annual meeting a getting together through committees or by any other means should be encouraged so that they may work as a whole.

We often hear comparisons between our meetings and other state meetings, but when we compare the lack of transportation and bad time-schedules, we marvel that there are any meetings at all. Kentucky is to be congratulated upon the showing she makes and the loyalty of her dentists.

I often have thought in the past that if it were possible to have our annual meeting in March on some definite day, say the second Tuesday, it would facilitate the holding of a good meeting. May is a time of the year when the dentist out in the state is busy, and the college men are busy, and it makes it difficult at times to get the talent for a meeting; and if one is successful, it is difficult to get the crowd. The weather in March is better for meetings held indoors, as it does not interfere with manufacturers making their exhibits at colleges, thereby netting the society more money from space sold.

In this instance, all the hotels in town are sold out for the Derby, and many of the dentists will need to give up their rooms on account of others having options on them for the races. What we need is a crowd free from all friction; it will help us to grow, and as we are growing we will grow faster. This, of course, would need be taken up by the society and worked out.

Our little dental bulletin is more than serving its purpose, and I take this opportunity to thank its editor, Dr. W. M. Randall, and through him all the editors of the component societies, and also the publisher, Dr. Crutcher.

Lots of good is derived from this bulletin, and it alone has been the means of keeping the component societies in touch and welding them into a whole.

All of the committees under me this year have done their share to make this meeting a success.

In closing I want to thank you again for this honor, as well as all other positions of trust you have placed in my hands, and upon my retirement from office will always look back to this time in my life as one of the choicest milestones in my career.

THE FORSYTH DENTAL INFIRMARY CLINICS IN THEIR RELATION TO ORAL HYGIENE EXTENSION*

BY HAROLD De W. CROSS, D.D.S., BOSTON, MASS.
DIRECTOR OF FORSYTH DENTAL INFIRMARY.

AS THE SUBJECT of this paper indicates, it is intended to serve a two-fold purpose; first, to make an attempt to show how interest in the oral hygiene movement may be created in new communities, inducing them to establish clinics, and to state for comparative purposes the various methods by which the work is carried on at the Forsyth Dental Infirmary for Children, in Boston.

Several years ago I believe Dr. Rauh proposed a plan of standardizing dental clinic work, methods, records and general system of operating. While this is really an ideal plan, it seems to me that it will be necessary to wait until such time as there is someone, or some group, who actually knows what the ideal conditions of such clinics are; for there are so many different views held at the present time in regard to the manner of conducting children's clinics, none of which have been in operation a sufficiently long time or under sufficiently uniform conditions to warrant anyone feeling that they have found just the right thing to do. But this does not mean that it will be necessary for the movement to remain at a standstill, for each clinic may, with a great deal of benefit to the others, begin to tabulate and standardize the manner of conducting and the various benefits of its clinics, the record of which can be used to great advantage as an aid in interesting new communities in establishing clinics; this plan, if properly worked out, would make it possible for a person being interested in the establishment of a clinic to obtain definite and authentic data of such a nature as to be almost absolutely convincing to any board of health, education or municipal authorities. It is not necessary that humanitarian ideas be brought into these reports, only actual facts largely of a financial nature, and showing the absolute advantage and saving of money and gain of health which in turn means actual gain in efficiency. This could be more efficiently done by a central committee or board established to collect and tabulate this information in such a form as to make it readily available for presentation, and I believe it would be of great help in aiding those interested to present the matter in such a manner as to obtain definite results in other communities.

It seems to be a fact that new movements, in regard to the establishment of children's clinics are usually inaugurated either by individuals or by societies becoming so much interested as to be willing to subscribe or collect money in order to finance the innovation for a period of perhaps a year or more, during which time the advantages become known and recognized by the public and the authorities. This plan, I have learned, has been almost universal in Massachusetts, not only in connection with clinics but with all improvements and innovations requiring the expenditure of money in connection with any of the public boards of the commonwealth, such as the State Board of Insanity, State Board of Health, and others.

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*Read before the Ohio State Dental Society, December 6th, 1916.

There are so many ways in which communities, institutions and various boards may be interested in the clinic plan, each one of which has its own merits and each one of which is especially applicable to certain localities, that it seems almost impossible for one to say which is the best method. In attempting to learn directly from the various clinics already established (list of 150) in what manner they came into existence, it has so far been almost impossible to make any definite tabulation or classification of methods which would be of any value to those desiring to do something of a similar nature. In fact, your committee has asked me a question (which is frequently presented to me by people in the vicinity of Boston), namely, how best to interest communities to establish and maintain dental clinics for the children; and I am obliged to answer, as I am you at the present time, that I do not know of the *best* way; I know several ways, but each community will have to decide for itself what is the *best* way.

Primarily this whole question rests on the dentists. They have known, at least a few of them have, for a good many years practically all that is now known in regard to oral hygiene, the importance and the benefits of it, and they *have failed* to pass this definite information along to the public at large in a convincing way, or in a way to create real interest. Therefore, having failed in the past it is more than ever the duty of the dental profession to undertake this work, and upon it, I believe, primarily rests the responsibility of inaugurating the plan of establishing clinics in every locality. If the dentist will do his part in interesting the proper authorities, either directly or through various societies and organizations, and if dentists of that community are willing to put in the necessary work, I believe it is possible to establish a children's clinic in practically every community in the country. Co-operation is a prime factor, co-operation of dentists among themselves and with all school and health boards.

There has been so much agitation of the subject that the public has become informed and interested in the idea of oral hygiene to such an extent, and the medical profession has so thoroughly endorsed the necessity of care of the mouth and teeth, that it is an easier thing to create interest in a clinic now than what it was a few years ago. It is possible to present very definite advantages to be gained from the clinic, not only theoretical advantages, but actual gains in efficiency; and it has been proven that there is a very distinct gain in the health of children whose teeth and mouth are attended to; it is not only a help to the present but also to future generations; there is less liability of infectious and contagious diseases and the diseases of childhood not only to the individual but to the community; the absence from school is very greatly reduced; fewer pupils are obliged to repeat their school course, and the cost of re-educating these actually more than covers the cost of the necessary clinics, and the children will make better, healthier and more useful citizens. Manufacturing concerns, stores, insurance companies and others are inaugurating clinics purely from the financial standpoint, knowing that they are the direct gainers thereby. It will not be long before it will seem as logical to provide for the physical well-being of the child as it has and does now to provide for the mental development; it is merely a question of the public becoming accustomed to it

The Forsyth Infirmary has not been working long enough on the plan of treating younger children to be able to give any very definite statistics which would be of much value as showing the gains which are made in the schools, except to say that it is the unanimous opinion of the school principals from whose schools the children have received the most comprehensive treatment, that these pupils show a decided gain in efficiency, interest and ability to study, less absences and fewer are obliged to go over the year a second time.

It is almost like bringing "coals to Newcastle" to attempt to prove the advantages of children's dental clinics in a city so near Cincinnati, in one of the schools of which was given, probably, the most elaborate and comprehensive proof of their value that ever has been brought forth.

Every community, whether able to establish a clinic or not, should at least have a definite requirement of the Board of Health, compelling all children to bring a card approved by some dentist indicating that their teeth have been put in reasonably good order. This in itself will soon make a demand for a clinic by those who are unable to pay the necessary fee for this service, and once the demand is created the providing of the clinic is relatively a simple matter.

Personally, I do not see very much advantage in having the teeth of the children *examined* in the schools. *All* children need dental care and attention, especially at the age of five to seven years, and the amount of time and energy expended in making such examinations in schools and the cost of this work can be put to very much better advantage in doing the little filling and extracting indicated. If such a plan could be made a requirement in every community, it would be a long step in the direction towards the real solution, something which would solve the problem once and for all, that is, that *all children* be required to have their teeth and mouth in good condition, clean, cavities filled and no stumps, *before* beginning their school career, requiring that they obtain a certificate of dental health in order to attend school.

BETTER THAN VACCINATION

If the child could enter school with his teeth and mouth in good condition, it would be a far greater advantage and of much more benefit to him and a greater protection to the individual and the community health, in ordinary times, than is the almost universal requirement of vaccination. Few individuals pass through more than two periods of an epidemic of small-pox; yet the child is subjected five hours a day, every day of his school life, to the infections from the breaths of all the other scholars in the room, whose mouths and teeth may be in the most unhealthy condition imaginable; not only may be, but ninety-five per cent. *are* in this condition in most of the schools.

There is probably nothing which makes the passing on of contagion more certain than a mouth which is unclean and teeth with large cavities in them. It has been definitely proven in institutions where it is possible to maintain complete oversight of children, that infectious and contagious diseases can be practically eradicated by keeping the teeth and mouth in good condition.

Another important phase of the situation is the oversight and attention which the teacher can give to the child. If clean teeth were as definite a requirement for attendance at the school as clean face, hands and heads, the child would be continually subject to a reminder that his mouth must be *kept* clean. The school teacher probably has more influence on the child than nurses or doctors, or even their parents, and if the plan of the teacher's supervision for clean teeth can be added to the other things it would not be a waste of time but would definitely accomplish a great deal. Much better results are obtained where the child is subject to oversight and is followed up and made to keep his teeth clean than is derived from giving him an extended amount of knowledge as to the benefits which may accrue from such care and attention. It is better for a child to have the *actual habit of cleanliness* than to have extended knowledge in regard to the *physiological effects* of such cleanliness. If oral hygiene were made "*entirely practical*" in the schools in some such manner as indicated, we might expect very definite and satisfactory results from it.

(Quoted from J. Mace Andres, "Educational Standards"): "Right teaching leads to some definite form of action and mental attitude. Not to discover knowledge of the process, but ability to perform, is the test of the advantage of a course in arithmetic."

Now to give you a general idea as to how the clinics of the Forsyth Dental Infirmary benefit the children who are attending them and the manner in which these clinics are conducted:

All children up to sixteen years of age, regardless of race, creed, sex, color or locality, are admitted, if eligible financially, *that* being the only definite requirement.

As the institution is a dental one, attention to purely dental defects takes precedence over all others, except of an emergency nature, and every child admitted is first required to either have his teeth put in order or to show that this has been done, before he can receive any attention in the special clinics, such as the nose and throat or orthodontic; but on the other hand, in order to make the work for the child complete for each individual case, after the teeth have been put in order, it is required that he go to the nose and throat and orthodontic clinics to have an examination made, and receive treatment according to the necessity of the case and the facilities of the clinic at the time

The children come largely from the public and parochial schools of Greater Boston, selected by nurses and teachers who are given reservations for a definite number of children, and as one child is finished, another is automatically put in his place. Quite a considerable number of children are received from the various children's institutions in the vicinity of Boston, as well as many who come "individually."

The service given each child is as complete as possible, and all that is necessary is done, regardless of the ability of the child to pay; that is, there is never a question as to whether the little patient can *afford* a synthetic filling, if one is indicated, or whether he can *afford* novocain or N^2O, for these things are entirely a matter of what is *needed*, and is decided by the operator.

In this the Forsyth clinic is different from many heretofore existing dental clinics, as it is *entirely* for the *patient*, while dental school clinics, although sometimes charging only a small fee, of necessity *prevail* primarily for the dental *student*.

It has been the unanimous opinion of the trustees of the Forsyth Infirmary that the simple treating of children's teeth and the extraction of hopelessly defective ones could be regarded as a palliative measure only; that while it would improve existing conditions, it would not eradicate them; that the activities of the clinics would be directed towards remedying the conditions in succeeding groups of children without any effective endeavor having been made to remove the underlying causes of the present widespread prevalence of dental caries among the children of the present generation.

It was accordingly decided that for the Foundation to produce the greatest results its efforts must be twofold; first, the prevention of the existing prevalence of oral diseases, and second, the treatment of conditions as they at present occur. It was easily recognized that the *prevention* of disease was the most *important* function.

To prevent the wholesale prevalence of dental caries it was evident that attempts ought to be made not only to disseminate existing knowledge but also to increase and extend that knowledge. To this end a campaign of education must be carried on; education of parents, teachers and children upon the importance of sound teeth and healthy mouths, and as to the best means of promoting oral hygiene.

After a few months' work it was easy to note that while a very large number of children were being treated and a correspondingly large number of operations was being done, that a failure was being made to get at the actual difficulty; that the cases did not reach the Infirmary until they had *already* suffered much pain and when the *damage had already been done* to the sixth-year molars, and that much time which ought to be available for new cases was being taken up by long-drawn-out root-canal treatments on neglected six-year molars. This led immediately to a plan which would enable the clinic to treat many more cases and to do a correspondingly greater service for those treated.

In order to accomplish this it was necessary to eliminate, as far as possible, the older cases, those with hopelessly broken-down sixth-year molars, and also to interest those bringing the children to select younger ones, at about seven to eight years of age; the present plan being to begin with the third grade and to work towards the first, completing all work for these three grades during the year. When this was presented to the school authorities, there was much doubt as to its being a desirable plan and there was considerable objection to reducing the time spent on the older children. Many arguments were brought forward in regard to the advantages of giving attention to the children of the seventh and eighth grades; but after presenting the plan and going over it very much in detail, and explaining that we were considering not alone the pupils at the present time in the seventh and eighth grades or even those of the present generation, but the countless generations to come, I am very glad to say that the entire school authorities of the public and parochial schools of Boston and vicinity are co-operating *splendidly* with the Infirmary in this plan—to care for the teeth of *younger* children and to do for them what needs to be done and *do it before* the sixth-year molars have been seriously involved.

This plan has not been worked out without encountering many difficulties, a large number of which have to be met by the school nurses collecting and bringing the children to the Infirmary. It is necessary not only to convince the school authorities but to *convince the parents* of the children that it is not only desirable but *absolutely necessary* that this work should be done at this age. Those undertaking this work have done so with such enthusiasm and energy that they are now able to bring to the clinics practically as many children under nine years of age as they were previously bringing up to sixteen years.

The work of the operators at the clinic has been largely increased by this attention to the younger children, as they need more coaxing, and work cannot be carried on quite as rapidly on the first visit as for older children. But all these difficulties are well worth while; so much so that it is anticipated that in a year or two the next step will be to arrange to have still younger children—from five to seven years—come for routine treatment. Many are now coming at this age, brought by parents and teachers. Later we shall have those of three to five years.

This plan of eliminating older children is provisional or only partial for the present, as they are still admitted, but only for simple fillings, as no treatment of root canals is applied except in anterior teeth, but those originally admitted under nine years still will be treated up to the sixteenth year as heretofore (also thus under old plan).

As an aid to getting the children to the Infirmary at the right age and before the damage has been done to the sixth-year molars, simple diagrams have been made and are distributed to all schools and institutions sending children to the clinics, which enables even a person unfamiliar with tooth conditions, a teacher for instance, to determine the time to send the child. The chart combines age and eruption of the teeth in a manner that will avoid any confusion in case the child is backward in development. This chart is not really needed as *all* children ought to be examined at five years or as soon after as possible; but the chart helps to attract attention to this fact, much as does the use of tooth paste or powder.

PECUNIARY ELIGIBILITY

The Forsyth Infirmary extends its benefits to all the children of Boston and its suburbs under sixteen years of age whose pecuniary circumstances preclude their securing the services of a private dentist. At the present time this pecuniary eligibility is based upon the maximum of four dollars per week per person in the family. That is, if the family income is twenty dollars for a family of five, the children of that family become eligible; you can see readily that no very elaborate dentistry could be afforded out of that amount. Variations are made on account of sickness, invalids and others to support, etc.

The clinic fee is five cents, paid for each visit, but entitling the child to all that can be done in one visit, even if in more than one clinic; but no child is refused treatment if unable to pay the required fee. There is no provision for patients paying "special" fees although there have been many requests, and admittance to all the various departments is on the same basis, regardless of the type of work to be done; those eligible to any clinic are eligible to all, and vice versa.

The re-visits or return of the older cases treated and dismissed for six months which have required new work so far have been only about forty per cent., and only one-fifth of these have required more than one visit to do the prophylaxis and one or two small fillings needed; (this will undoubtedly be much lower with younger children) and appears to be kept so low by three factors:

First: The *completeness* of all work, giving the child a *really clean mouth*, filling *all* cavities, extracting all teeth and roots not filled, and removing infected tonsils when present, also obstructing adenoids, and attention to irregularities which are a detriment to the health of the child.

Second: The work is *thoroughly* done by graduates who have been selected for their proficiency in a competitive examination, accepted only after a month's probation and held up to the Infirmary standard by a system of checking and inspecting, and the work is done on a conservative basis, i.e., attempts are not made to keep pulps alive or to avoid extraction, unless there is a very good likelihood of the attempt being successful. Practically no canal treatments are done except in anterior teeth. This work has been given up to make room for the younger children, and it may be wise also on account of the large foramina and the possibility of future infection.

Third: The teaching of the principles of oral hygiene and the compulsory enforcement of cleanliness during attendance at the Infirmary, putting the entire responsibility of clean teeth on the child. This makes such an impression that he involuntarily continues after his visits are completed, with the result that the fillings hold up well and new cavities progress slowly.

This oral hygiene routine has been very much amplified during the last year so that it is now made a part of the *regular routine* of admission and continued during the periods of visits. All children coming to the clinics are required to go to the oral hygiene room where they are given brief but definite instructions in regard to the care of their teeth, and are told that they will be obliged to keep their teeth clean if they expect to be treated. A similar inspection of the teeth is made on the second visit, and if they are not clean, the children are given a warning that unless they are clean at their next visit that they will be sent home and not permitted to go to the clinic. This inspection and warning is made a positive routine in connection with the passing of the child from the waiting room to the appointment desk, no child being passed through this doorway without a proper mark from the Oral Hygiene Department. This practically means that all the children who are receiving treatment at the Infirmary are keeping their teeth clean at least during their treatment. There is a follow-up system arranged whereby each child returns in three months, and if at this time his teeth and mouth do not give indication that he has been carrying out daily cleanliness, he is given to understand that unless he does this he will not be eligible to return should he have a toothache or any other necessity for re-visiting the clinics.

Out of perhaps fifteen to eighteen hundred childred treated each week there are, on an average, probably not more than twelve children refused treatment and sent home because of dirty teeth. While they are held up thus rigidly to what we term "compulsory cleanliness," there is another phase of the situation, for encouragement is offered to the child who will keep his teeth clean. He is encouraged by being referred to in the group of children in the oral hygiene class, and is set up as an example to the others; and children who have kept their teeth clean for a given period and who have the approval of their teacher and dentist at the Infirmary are given a "Forsyth Clean Teeth Button," and are told that they can only wear that button as long as they keep their teeth clean every day. The children are very enthusiastic over these buttons, and during the last year approximately two thousand have been given out.

ADVANTAGES OF COMPULSION

We find that this compulsory method, even though the time allotted to it is only five minutes for inspection, instruction, warning and encouragement, works several hundred per cent. better than the plan heretofore adopted of attempting to give the children a treatise, as it were, on oral hygiene, explaining the benefits, advantages, etc., which they would obtain by keeping their teeth clean. Many excuses are given by the children as to why they come to the clinic with teeth which are not clean. Only recently many of them ate candy and cake, and explained that it was necessary to do this to avoid car sickness, or some other equally good excuse; but all these things are tabooed. Nothing is allowed during the trip to the Infirmary except chewing gum, and that only for children whom the nurse advises are subject to car-sickness, and these children are required to bring a brush carefully wrapped in clean paper or envelope and brush their teeth before going to the Oral Hygiene Department.

While it is believed that more gain can be made with the children than with the parents, we are not overlooking any opportunity, and during the interval when the children go to the oral hygiene room, the mothers, fathers, older brothers and sisters who may be waiting for the children, are encouraged to go in and receive instructions and advice in regard to oral cleanliness and other forms of hygiene, including advice in regard to diet, etc.

It is not thought to be necessary to adopt a plan under which dental nurses clean children's teeth on each visit, as this plan does not foster the formation of the "cleaning habit," but on the contrary teaches the child a certain amount of dependence which is undesirable; also it is unnecessary, as it has been proven that a child can do this himself and do it satisfactorily.

The average number of visits required for a case to be treated, completed and dismissed has been gradually reduced from fifteen, during the first three months, to about three and one-half at present, which is, of course, a great davantage to all concerned—the teacher, the child, the Infirmary, and other children whose admission is dependent on those coming first being discharged to make room for them. This reduction has been accomplished in several ways, among which at first were, of course, establishing a systematic way of attending to all details, such as speed in getting children to and from the chair and getting instruments distributed quickly. After these were systematized the next step was to determine just what should be done to the child's teeth and the best way of doing it; the quality and especially the amount of work which an operator should do in a given time, the duration of the appointment period, etc. Operators are now required to do an average of twenty-six operations per day, eighteen of which shall be fillings, based on a week's work. This means that they must average four operations per hour, which all will agree is efficient work, considering that it is done entirely on rather young children and much time is necessarily wasted in getting the child in condition to allow the work to proceed; with very young children a prophylaxis treatment and one filling is usually all that is done on the first visit.

SELECTION OF OPERATORS

Permanent staff operators are selected by a competitive examination, and are appointed provisionally for one month, during which time they are required to reach the standard in order to receive a regular staff appointment. In regard to this standard of work which the Infirmary demands, it is required during the first week of an operator's probation that the cavity preparations and fillings should be checked and marked in percentage by the chief of the clinic. During this first week quantity is not considered to any great extent, it being the purpose to ascertain if the operator has had the proper training and has developed sufficient ability in regard to the *quality* of his work. During the second week the cavity preparations and fillings are checked as before, and in addition to this the operator must make a total average of sixteen operations, which shall include at least twelve fillings. A definite number of prophylactic operations are also shown to be marked during this second week. This same provision is carried out during the third and fourth weeks, with an increase in the quantity of work which is required, until, during the fourth week the operator reaches the total requirement of an average of twenty-six operations per day, eighteen of which must be fillings. During this entire month it is necessary that the operator should maintain an average of eighty per cent. in regard to the quality of his work, and he also is required to obtain a passing mark of eighty per cent. in a quiz, held during the second or third week on "Methods of Procedure and Operation," as adopted by the Infirmary.

There are unusual opportunities offered to members of the permanent as well as of the visiting staff in regard to special clinics, such as orthodontic, novocain, extracting, nose and throat, X-ray, etc. Positions on the visiting staff are open to all reputable practitioners, and in return for a few hours' service a month, in dental work at the chair, they are entitled to the privileges of special clinics, lectures and demonstrations.

A Surgical Department, including a division for tonsil and adenoid work, provides an important part of the service which is given to the children. This nose and throat branch is in very close relation to the dental work, especially the orthodontic, and it was mainly for this purpose that such work was planned to be done at the Infirmary, as it has not heretofore been customary to do this in dental institutions; but the trustees felt that only by making it a regular part of the Infirmary work could it be carried on to the best advantage. Wards are provided for the care of children before and after operations, and there are seven beds in each ward and a trained nurse, day and night, who give suitable care to the patients.

Strictly speaking, prophylactic work can be done only for children, for it is impossible to prevent that which has already happened. So work for children must be considered as "real prophylaxis," and this phase is just beginning to be practiced on a scale of any magnitude; as dentistry advances it deals more and more with prevention and consequently this means *younger children.* Irregularities we now know and recognize as existing in the temporary teeth, and that they require correction at a very much earlier age than heretofore thought necessary; likewise attempts to control caries must be *begun earlier*, and these teeth kept in such condition that infection will not be passed on to the second set; so the Forsyth Dental Infirmary has been confronted with many new problems from this standpoint.

While the Infirmary is an independent clinic, with no direct affiliation with any institution, school or society, yet it is necessary for it to do its share in educating the public along such lines as will make the work of its clinics more effective, and this may be summed up as follows:

First: The clinic cannot take care of all the defects if they are allowed to go too long.

Second: The clinic cannot accomplish much alone, because it cannot, independently, get in touch with the child at the right period.

Third: The school physician, nurse and teacher must co-operate with the clinic if it is desired to really strike at the root of the trouble and work must be carried on along two lines:

First: To help the clinic get in touch with the child at the right periods.

Second: To teach and follow up habits of mouth cleanliness.

The clinic will do its part by:

First: Instructing the teachers and parents what habits to teach the child.

Second: By advising the teacher and parent at what periods it is necessary to take the child to the clinic.

Third: By doing the actual dentistry needed (cleaning, filling, extracting).

By following this outline, ninety per cent. of decay and toothaches may be prevented and the dentist can accomplish much more for the children he sees, and he can see five times as many in a given time.

If every child had his teeth attended to between the ages of two and four, and five and seven years, there would be relatively little to be done, but that little would prevent a great deal occurring later on, and this attention taken with the actual formation of the habit of suitable daily care would soon fill our schools with children who would not know what a toothache was and who would have clean mouths and sound teeth, capable of thoroughly masticating their food, and who would be relatively free from the diseases carried and transmitted through the mouth, and whose bodies and brains would be correspondingly sound.

Try your hardest, give all you can, act by the inner light and stand true to what you know, and let the result take care of itself. You will be surprised to find that it was not nearly so bad as you think; perhaps it was more than passably good; possibly it was excellent. If you are too anxious about the impression you are less likely to succeed than if you are passionately engrossed in what you do. All is forgiven to sincerity.—*Philadelphia Public Ledger.*

SOME IMPORTANT ETIOLOGICAL FACTORS UNDERLYING MALFORMATIONS OF THE ORAL CAVITY, THE FACE AND THE BRAIN*

BY WESTON A. PRICE, D.D.S, M.S., CLEVELAND, OHIO

(Continued from page 587, August Summary)

WE will now have the motion pictures which will show you developing in detail that process. While he is getting the film ready to run I want to give you one or two important illustrations. In Switzerland they have made a canvas of the defectives to find in what districts they occur and what has been the origin of them, and strange to say they found out of 8100 of them the majority were born in the wine districts and a further investigation established the remarkable fact that there were more born in one month than in any other month, and that month was just nine months after the national annual feast. (Motion pictures.)

Here we have the star fish, and in these forms of life which we are studying, a large part of the body, about four-fifths, is given either to the production of eggs or sperm. The star is about the size of a person's hand; the eggs are about as small as can be seen by the naked eye, and there would be 500,000 to 1,000,000 of the eggs in one animal. We take the egg and fertilize it by putting the sperm into the field. Here is the male element. Only one male element gets into that egg. The remarkable thing is that a thick, tough layer comes around it so quickly that the second one cannot enter after one has done so, and this egg is going through the same process that each one of us went through. Here is the division into two cells, then the division into four and during this period the additional sperm are swimming around through the field, attracted to the egg but cannot enter it because of this fertilization membrane which has formed about it; here you have eight cells and here sixteen cells, and they are very regular and methodical and perfectly designed. Here you will notice a large number of the male elements adhering and clinging to that fertilization membrane, attracted to the egg by a chemical affinity that we call chemotaxis, and in a short time you have the form of the sperm swimming about the field. Here you have the inner layer of cells, another layer of cells here and a layer between, the three primitive structures producing the various tissues of the body. This is a typical and normal sea urchin. This is the egg before ripening, and part of the process of ripening in all forms of life is that half of the chromosomes must come from the female element to make place for the male chromosomes to come in. Here we have the sperm swimming about the field. Watch that one come in. In this type of egg part of the chromosomes come off and here we have the extra chromosomes of the female elements that have come away to make place for the chromosomes of the male element. Here we have several eggs that have not been fertilized and others that have. Here we will watch this one divide, watch the division as it takes place about at the same rate as the other, but the sperm are swimming about the field sometimes for hours after the egg has started its division process. Here you have the formation of the nuclei, and we have the four cells here. Keep in mind this is precisely what took place and does take place with the human embryo in the human embryonic development as to each one of us. Each one of us was a one-celled animal, then a two-celled animal and then a four, and so forth, differing only from those protozoa that we saw last night in that they continued to be one-celled and we became multicelled animals. Here is the polar body carrying the extra chromosomes that have come off to leave room for the male chromosomes—part of the marvelous process of fertilization. Here are some fertilized and some that are not, but the thing that impressed me was to find how exactly those divisions took place.

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*Stenographic report of a lecture before the Iowa State Dental Society.

I might be pardoned for saying that this is the first time I know of that these processes have been reproduced in motion pictures. At least they told me so at Woods Hole where we were making the studies last year. Very soon now you will see the sixteen cells. It is a beautiful process to note it developing and it is almost identically as you see it here. Here you see in that organism the development of the skeleton by the calcification taking place in certain spots. That is normal and later you will see the abnormal Here we have the sperm highly magnified. Do you see that one entering the egg? Now no other than that one can get in because immediately the skin toughens around the egg by the chemical action. Here we have a very good view. Here is the polar body forming. This is a different type of egg and that developmental process will go in this egg differently than in the last because it takes food in to one part of the egg to become the food for the embryo. This will be our first division, and you see that now more plainly here and that one-half of the egg is larger than the other; but we have the division just the same. You see the notch entering the side for the division.

The next is a very interesting process. Nearly all of the fertilization processes that you notice take place either in sea water that we have been looking at or within the body. This type fertilizes in the body and in four seconds ejects the eggs into the sea and each one has sperm within it. In four seconds from the time of the fertilization, which is taking place now, this little worm-like organism ejects a million of those eggs. I cannot imagine a chemical process so rapid as this, for each one of these forms a jelly-like mass around it so quickly that the second sperm cannot enter it.

We will study this process with this egg, as it is an unusually clear one, and note when the fertilization takes place the eggs will start to move apart, not because of the formation of a tough membrane in this case, but because of the formation of a transparent jelly which pushes the eggs apart, sometimes as far apart as the width of the egg itself. This boundary line that you see forming between them, that dark line, is made up simply of the male elements or sperm that are pushed back here in their effort to try to get to the egg, a marvelous provision of nature to keep the egg free from more than one entry, which would make for deformities. This is a coalescing of the little droplets as you see here. This in a few hours starts to swim about the field.

The normal and abnormal development of fronds and squid embryos is here shown. Here is the head of this little fish shown perfectly plain and with it you will see in the same field a deformed fish, deformed by placing alcohol in the sea water. Notice the deformed head, due to adding a very small amount of alcohol to the sea water and ninety per cent. of the embryo can be made to be defective if just the right amount of alcohol, which is a very small amount, is added to the sea water. Here we have the developing form and note the beautiful rhythmic motion and it goes through several different forms; some of them are very beautiful and very interesting. Here is one form of the cilia and a little later it will take on a more advanced form. Those little whip-like masses whip the sea water into the gills. Here you have the division. This one you see is just developing the extra mouth and here we have the second mouth perfectly formed in a very short time. Now we will magnify that a little more highly and you will see in the structure of that body the various muscular movements almost identically like the human stomach movement. Do you see the muscular movements taking place? And yet that organism is only, perhaps, one-tenth the size of the head of a pin, almost too small to be seen with the naked eye, and when we magnify it we find this perfect development of the gills. Note the heart beating; there is the heart of that microscopic embryo. This is the squid and one of the most beautiful small organisms that we can study. These are very beautiful as they change their color, but the interesting thing is that that organism is developed with a sucking bottle; this is an actual sucking bottle filled with food and finally it appears attached to the mouth. If we take that fellow more highly magnified we will see that he has no sucking bottle; he is too old, does not want one any more. Here is one with a sucking bottle as large as his body, and watch this one drinking out of his sucking bottle. And yet that whole organism is smaller than the head of a pin.

We can produce artificial fertilization with certain chemicals, but rarely if ever do they grow beyond the first generation. Frogs have been able to live for a year, but here we have organisms that are normally developed; and I want you to note the deformity of the same organism by treating with certain chemicals when in the embryonic form. That is the normal and here is one treated by adding a little alcohol to the sea water, or muriatic acid, which forms in the human body when the kidneys are out of order, or acetone. Here we have a pair of twins and the interesting thing is that they try to swim in two different directions—one is trying to go one way and the other the other, and it is very difficult to keep them in the microscopic field; there is that jerky motion all the time as they undertake to go in different directions. This is produced by adding chemicals to the sea water in which they are developing. Here are other deformities, different types of deformities produced by adding those same poisons to the sea water. The mechanisms that I spoke of last night are shown beautifully with the paramecia when the galvanic current is passed through them. You notice that they are now entirely beyond the control of the current. Note particularly that they are now swimming in any and all directions. As soon as the current is passed through the field they all start in one direction; then as the current is reversed they go in the other direction, and they cannot help themselves. It is entirely a mechanical reaction.

The man who has recently invented the submarine that is controlled by wireless has also invented an artificial dog that will follow him all over the house or the yard when he carries a lantern at night; simply the same mechanism that this is—that he allows the light to act on the selenium cells which will operate the mechanical muscles in the two sides of the animal in different ways.

If we take the same organism and reverse the current so rapidly that they cannot get into motion, you will notice that they just vibrate in the field; once in a while one will break loose.

These mechanisms are very beautiful and when we study the cilia of the human throat, a frog's throat, or an animal's throat, we will find they are almost identical with the smaller forms of life. Here is the tissue taken from the throat of a frog, and you will see that it swings about the field because of the mechanical movement of the cilia themselves. We think of lots of these processes as being due to some instinct or something of that kind on the part of these forms of life, but it is not. It is not due to instinct; it is due simply to reaction to mechanism. I think there are a great many of these processes we have looked upon as being due entirely to instinct and have come to understand finally that they are due to mechanical and physical processes and the danger will be that we will not think that, because we can understand them, therefore we do not need to have a God, we do not need any providence to provide for them. I look upon it simply as seeing the footprints of God and I think there is all the more need of providence.

Just a little as to the application of this work. It is rather significant that human biological experiments correspond entirely to these laboratory experiments. As an illustration: A certain woman who is known very well, had as her first husband a man with a splendid character and a splendid ancestry. They had three splendid children, all of whom made splendid citizens. Unfortunately, that husband died. She married a lion of society, a man who liked the social glass. They had three children. One was a degenerate morally, another was a nervous wreck and another was an imbecile. Fortunately, that husband died, too. She married the third husband, but the third husband was also a man of good character and good ancestry and good habits. They had two children, both of whom were splendid citizens with splendid characters. That was not an accident.

Another illustration: In New York state there is a history of a family known as the Jukes. Mike or Jacob (or whatever his first name was) was a criminal who co-habitated with a woman who was of a questionable ancestry—questionable in her habits of all kinds—and of their three children they had three types of descendants. One line of descent is largely if not entirely tending toward sex offenders, another toward pauperism and the third toward criminal tendencies. That one family descending from that criminal has cost the state of New York one and a quarter millions of dollars for legal proceedings and for caring for them. Not one character in the entire line of descent in over a hundred years has been a good character. Now take another and a parallel case: Elizabeth Tuttle, the grandmother of Jonathan Edwards, an ancestor of twenty college presidents, not one of the descendants of whom ever cost the state one penny. Is it an accident? No. The state of New York is spending $7,000,000 annually to take care of the feeble minded. The United States as a whole is spending $200,000,000, and an increasing amount year after year. Why? Simply because we are systematically allowing the splendid protoplasm that has been passed down to us by a long line of ancestry of the past to be injured by poisons like alcohol chiefly, lead poisoning, the defects of kidney poisoning at the time of motherhood, and so forth, and we are causing these defects because of the extreme sensitiveness of the determiners just at that particular time.

If we were to go to certain districts of the country, like Martha's Vineyard, for example, we would find in a certain locality one in every twenty-five of the people with cataract. In another district one in twenty-five are deaf mutes. In certain other districts a large percentage have certain other deformities. What does it mean? It means that when the determiners are lacking in both parents—and that is the result of the marrying of cousins for instance—where each has lacking in the system the same positive element, and they put into their descendants a lack from both sides instead of only one side, we find developing then certain defective characteristic types and traits, certain positive deformities. I think that is one of the greatest needs of this whole problem of the study of defectiveness—to eliminate as far as possible these removable poisons. Education, in other words.

When Christ was marching down towards Jerusalem with His disciples one day, He said to them, "Ye shall know the truth, and the truth shall make you free." He seemed to be looking down to this time when one after another of these great scourges would be swept away. He seemed to realize that people would know how to take care of their bodies and have no more yellow fever, and that if they kept the mosquitoes from biting them they would not have it, and they would not have any sleeping sickness, and a great many other things. But it seems to me that particularly He seemed to think of this time when we seem to be just getting the truth as to what is demoralizing our population, our humanity.

If the people of today knew the truth they certainly would not allow alcohol to be sold to destroy what it has taken providence whole countless æons of time to build up in protoplasmic force and put into your bodies and mine, to be destroyed in one moment or in an hour of time, so that all of our descendants are deprived of the benefit of that protoplasmic force that has come down to us through a splendid ancestry. We need, and we need immediately a national temperance. We need more than that. We need a conscience in the hearts of men and women. We need men to know the truth that unless they are worthy sponsors of that protoplasmic force that has come down to them they cannot expect to transmit to the coming generations the splendid ancestry or legacy of the past. And I know of nothing that we as a dental profession could do that will be more potent for the future than go into the study of this vital problem and get at the truth. You take its relation to these diseases that you and I are subject to. I myself have in my body a lack of determiners for a protective fluid for fighting the organisms of the streptococcus group. In other words, all my ancestry, so far as I can get the history, have been subject to rheumatism and heart infection. My boy early got heart infection and died of it. My mother died of heart disturbance. A large number of my relatives have been subject to streptococcal infection. Why? There has been destroyed in my ancestry somewhere the determiners that would give me a resistance to that particular type of organism. But I have strong determiners against tuberculosis and pneumonia. You may not have it and may have others. You may have no resistance to some other organism. It has been destroyed somewhere in your ancestry.

What we want is the truth. Oh, may God speed the day when we will know more about biology, when we will know more about physiology, when we will know more about bacteriology; in other words, know the truth, the blessed truth, the perfect truth that will make us all free and whole.

"Where there is no vision the people perish." Then spake the wise old clock-maker. "A vision," quoth he, "is something good and lofty and desirable which the soul may see, and having not may reach forth to obtain. Without a vision the body may live, but the soul is starved. It is life in death."

"Where shall I seek?" asked Anton. "At thine own work-bench," was the answer. "Do thy daily work, Anton, and let thy vision find thee working. Then shalt thou be ready to receive it, and the meaning of thy life and work will be made clear to thee."—*Walter A. Dyer.*

THE FORSYTH DENTAL INFIRMARY FOR CHILDREN

PERMANENT STAFF APPOINTMENTS

A competitive examination of graduates in dentistry (of less than three years' standing) for appointments to positions on the Permanent Staff for full and one-half time service will be held early in June, at the Infirmary.

Appointments will be made for one or two years as follows:

Full time service, requiring operating five and one-half days a week, at a salary of $1,000 a year.

One-half time service, requiring operating six half-days a week, either forenoon or afternoon, at a salary of $400 a year.

These appointments will be made subject to satisfying the requirements of the Massachusetts State Board of Registration in Dentistry, and to "qualifying" in the practical work of the clinics during one month's trial.

Members of this staff will be entitled to the advantages of reports and clinics by experts in the various branches of dentistry from different parts of the world, in addition to the numerous regular clinics and lectures.

Operators, after serving three months, are eligible, by qualifying, for appointments in the special clinics where post-graduate work is given.

The operators on this staff have the advantage of the clinics and lectures of the Post-Graduate School of Orthodontia.

The Infirmary clinics provide unusual advantages in the various departments of the institution where Operative Dentistry, Orthodontia, Nose and Throat and Oral Surgery, Extracting, Novocain Technic, Radiography, Pathological Diagnosis and Research Work are continually carried on.

The average number of cases treated daily is more than four hundred and fifty in all departments.

All material and necessary operating instruments will be furnished; up-to-date apparatus, including electric engines, sterile instrument trays fountain cuspidors, compressed air, and the modern operating room type of lavatories are available for use.

A diploma of service will be issued by the trustees to each member of this staff who has completed this term of service in a satisfactory manner.

During the months of June, July, August and September, an opportunity is offered by the trustees of the Forsyth Dental Infirmary for Children to a limited number of undergraduate students to act as assistants in the clinics of the Infirmary. This privilege permits a student to obtain unusual clinical advantages in the various departments of the institution where Operative Dentistry, Orthodontia, Nose and Throat, Oral Surgery, Radiography, Pathological Diagnosis and Research Work are continually carried on. Operators' gowns and all instruments are furnished.

HAROLD DE W. CROSS, D.M.D., *Director*

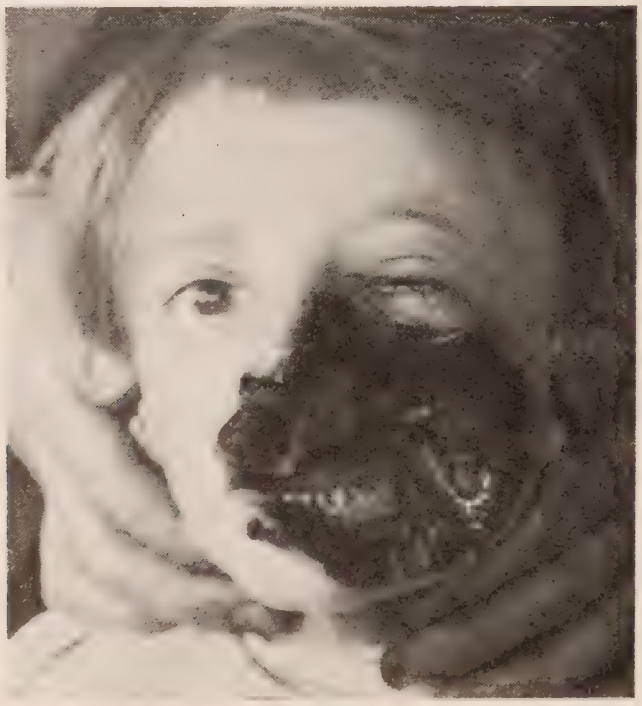
140 The Fenway, Boston, Mass.

ORAL SURGERY
CASE REPORTS

CONDUCTED BY HUGH W. MACMILLAN, D. D. S., CINCINNATI, OHIO
THIS DEPARTMENT AIMS TO REPORT INTERESTING ORAL SURGERY CASES IN BRIEF FORM, ILLUSTRATED BY RADIOGRAPHS AND PHOTOGRAPHS WHERE POSSIBLE. ARTICLES FOR THIS DEPARTMENT MUST NOT BE MORE THAN 500 WORDS IN LENGTH. SEND CONTRIBUTIONS TO DR. HUGH W. MACMILLAN, UNION CENTRAL BUILDING, CINCINNATI, OHIO.

CANCRUM ORIS

Case II, Fig. 1: Master S., age 4 years. Had mumps during 1916; had measles, followed by whooping cough during February, 1917. Had not completely recovered when, on June 5th, a foul odor from mouth and discoloration at corner of mouth left side was noticed. Case reported to city hospital June 15th. Temperature 102 degrees, pulse 140, respiration 36.



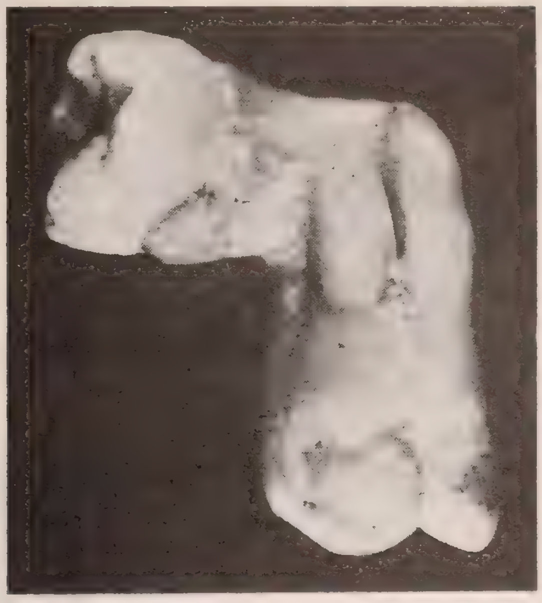
Case II—Fig. 1

Thorough examination revealed some Vincent's. Treatment with metheyline blue, ten per cent. formalin, radical removal of tissue, etc., with no results. Died 3:20 A.M., July 1st.

Of particular interest is that this child was conscious and comparatively active up to twenty minutes of his death. Another interesting point is the fact that, as in single hare-lip and cleft palate, we usually find the deformity on the left side; so also do these horrible infections seem to have a predilection for the left side.

Reported by S. L. Silverman, Atlanta, Ga.

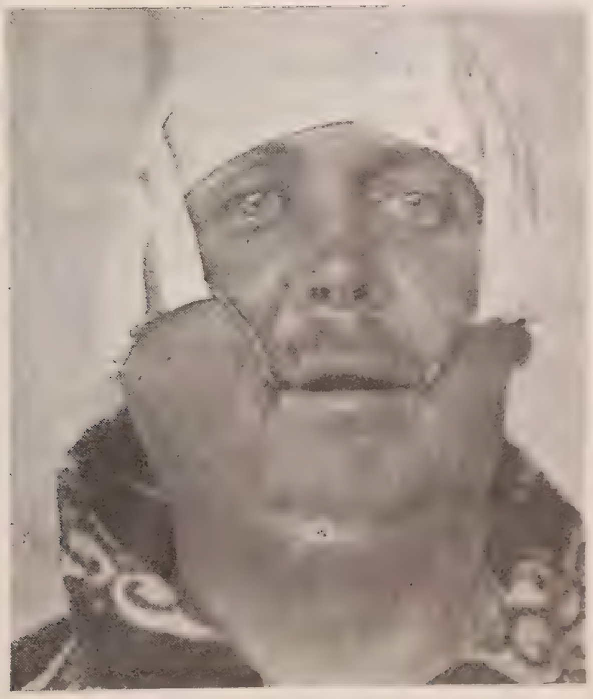
Case III: Mrs. A. P., age 40. *Fig. 1* shows fusion of upper right second and third molars at the apex. The second molar was in normal position. The third molar extended posteriorly at right angles to the second molar and was embedded in the bone, causing a chronic neuralgia. The teeth were removed under nitrous oxid and oxygen anesthesia and the neuralgia disappeared.



Case III—Fig. 1

Reported by Dr. John H. Beeson, Crawfordsville, Ind.

Case IV: P. P., age 45, was thrown out of an automobile, his face striking the curb. The upper lip was badly lacerated and the superior maxillary fractured horizontally just above the apices of the teeth. The palatal process containing the teeth would fall down when the mouth was opened. The laceration was sewed up and an impression of the vault of the upper jaw taken



Case IV—Fig. 1

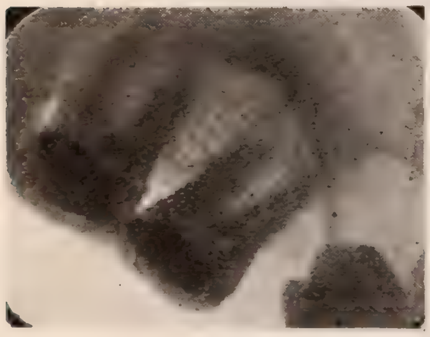
with modeling compound on a stick. A rubber vulcanite splint was constructed to fit in the roof of the mouth with wires projecting outside, as shown in *Fig. 3*. The fragment was pulled up into place and retained by bandages and adhesive tape. The right upper side became infected and was drained. At the end of six weeks patient was dismissed with normal occlusion.

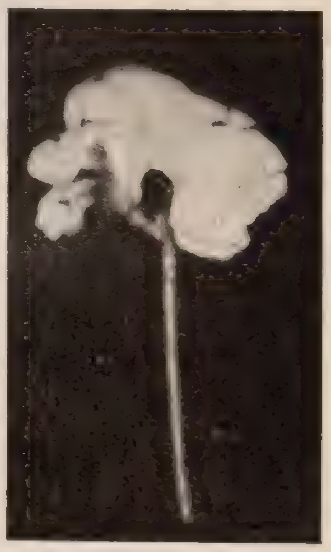
Reported by Dr. H. A. Reid, Cincinnati, Ohio.

AN INVERTED MOLAR

I am enclosing X-ray and photograph of tooth extracted last week, with history, thinking it may be of some interest to readers of the SUMMARY.

Case V: Mr. C., age about 37 years; first complained of pain in lower left second molar which, on examination, proved to be a vital tooth. X-ray taken, which showed the lower left molar inverted and with large abscess below crown. Sorry I was unable, on account of the circumstances, to get a better picture. Removed crown in one hour and forty minutes, under conductive anesthesia.





Case reported by N. T. Yager, D.D.S., Louisville, Ky.

CLOSE the covers and turn the key
(We're off to the woods tonight!)
Laden the table and desk may be,
(We're off to the woods tonight!)

But time for changing the lure of books
For the forest green and the woodland nooks,
The babble of print for the babbling brooks—
(We're off to the woods tonight!)

From Our Contemporaries

TO SAVE TEETH AND WAR CRIPPLES

SHORTLY AFTER the war began, a series of investigations to develop methods whereby the European nations might "put to work" their crippled soldiers was begun by Frank B. Gilbreth, the efficiency engineer. Closely following the announcement that he had discovered a plan to enable one-armed soldiers to operate the typewriter, comes his practical idea of conserving the teeth through dental nurses. After a study of the fundamentals of dentistry, Mr. Gilbreth concluded that a totally deaf, one-eyed, one-handed, legless cripple, properly taught, can do more efficient work in cleaning teeth than the dentist can do in the time for which the average worker can afford to pay, because the dentist's fee will be higher. He declares that this is no dream, but a working plan that can be carried out. The majority of people, Mr. Gilbreth has deduced, do not yet realize the actual money value of their teeth. Every dollar saved from the dentist at the present time is given several times over to a physician later on. Much ill health is traceable to poor teeth. Furthermore, few people know that most of the decay is easily preventable by proper periodical cleaning, and the rest of it can be taken care of by filling the cavities when they are first formed. Most people get their first knowledge of a cavity when it is large enough to cause the tooth to ache. This leads to the necessity for cleaning properly, and it can be done at little expense to the operator, says Mr. Gilbreth. To induce people to avail themselves of this dental nursing service, Mr. Gilbreth would first make it fashionable, and its absence considered economically and hygienically indecent. Parents should be held criminally responsible until the children are old enough to care for their own teeth, the engineer says. In a paper presented at a recent conference of the Society for the Promotion of Occupational Therapy, a copy of which the author sends us, Mr. Gilbreth sets forth the methods to be employed in establishing this new occupation for crippled soldiers. He says:

"In this age of destruction there is great need of conservation, and no conservation is so necessary as that of human beings. With the constant destruction of men in the Great War has come the pressing need of conserving and using the cripples, both war cripples and industrial cripples.

"We may place the cripple by * * * changing his old work * * *or we may place a cripple at some new work, such as dental nursing, that has never been done to the degree needed.

"Dental nursing may be defined as that part of prophylactic treatment of the teeth that can be done by a person without a complete dental training, namely, the polishing of the teeth by hand with stick and pumice.

"There is a world-wide lack of knowledge as to the relation of sound teeth to good health. America is recognized as the leader in the profession of dentistry. American dentists are recognized throughout the world as being, as a class, the most expert practitioners in all branches of dentistry, though other countries are now also coming to the front in this great human work.

"In spite of the great work of the dentist, even here in America and still more abroad, the care of teeth is generally looked upon too often by the public as simply concerning appearance, beauty and comfort or speed in the process of mastication, rather than as the most important factor of good health, while the dentist is too often interested primarily in filling cavities rather than preserving the tooth as a whole. The greater productive efficiency resulting from the natural use of all of one's teeth remains almost unappreciated. It is natural, this being the general view-point, that care of the teeth, or dental treatment, is often classed as a luxury rather than a necessity. The high cost of dentistry practically makes such treatment a luxury at present. * * *

"The work of the dentist is expensive, and must necessarily be. The high cost of dentistry is not surprising, nor is the profession to be blamed for it. The training for the profession is long, arduous and expensive—and much of the work involves costly materials, as well as time, and provides problems requiring no end of education, experience and the highest grade of skill. Dentistry provides an unlimited, satisfying field for the mechanical genius. How are we to provide proper pay for such work, yet insure necessary treatment to the average wage-earner?

"The answer is this:

1. By functionalizing the work of the dentist.
2. By having the trained expert to do the skilled work only.
3. By training low-priced workers to do such parts of the work as require less skill.

"The results of the functionalization will be:

1. Reduction of the cost of cleaning the teeth.
2. Clean, which means sound, or 'near-sound' teeth, within the reach of all.
3. Less need of costly work by the man unable to afford it.
4. Savings that can be devoted to such work, if it be needed.
5. Better health and added efficiency.
6. New work for the dental nurses, the cleaners of teeth. * * *

"Dental nursing will provide a new vocation, and at the same time provide for supplying a community need. It will take no work from those who need it. Rather it will relieve an over-worked profession of low-priced and low-skilled work. Moreover, being based as it is on motion study and fatigue study, it will supply at the same time occupations and interest, those fundamental needs of the crippled soldiers in all countries and at all times."

—*Literary Digest*, August 4.

EDITORIAL

PUTTING THE GOLDEN RULE INTO PRACTICE

The dental profession should feel honored by the men who have joined the Reserve Dental Corps. Men who have left their practices and homes to serve the nation in time of need, for there never was a time in the history of America when the country needed them more than it does now. The service of the dental surgeon has become an indispensable factor in the army and all praise is due to those who have volunteered their services.

In justice to those who have entered the army and navy, especially those who have given up a good practice to serve their country, the stay-at-home members of the profession have a duty to perform and that is to take care of the patients of the army dentists until they return, and then send these patients back to their former dentists after they have resumed private practice. The local dentists who get these patients with the intention of retaining them indefinitely as their own, should be classed as "human parasites" and publicly denounced. The manly, honest dentist will here apply the Golden Rule and serve his brother dentist as he would like to be served were he to go to war and the other dentist stay at home.

A short time ago the Columbus Dental Society passed a resolution bearing on this subject, that other local societies throughout the United States should adopt. It is as follows:

"Whereas, Our country has entered the world's great conflict in behalf of humanity and a world-wide peace; and

"Whereas, Our government has recognized the need for dental services in the army and navy in time of peace, and has provided for promptly increasing this service by making provision in both branches for Reserve Dental Corps; and

"Whereas, Several of the members of the Columbus Dental Society have patriotically appreciated their responsibility in this crisis, and others will probably take similar action; therefore, be it

"Resolved, That the Columbus Dental Society warmly commend those of our members who offer their services to the government in this or any other capacity, and be it

"Resolved, That our society go on record as recommending that the patients of those who may be called into the service shall be treated by such of our members as do not enter the service, but only with the specific understanding that they are accepted as patients temporarily and are to be referred back to their dentist as soon as he returns to his practice; and be it further

"Resolved, That this resolution be incorporated in our minutes and a copy mailed to each member of our society."

It is unnecessary to comment further on this subject, for we feel that dentists everywhere will see the justice of right doing and treat their brothers fairly.

SOCIETY·ANNOUNCEMENTS

Western Ohio and Northwestern Dental Society Meeting

The Western and Northwestern Dental Societies will have a joint meeting at Wapakoneta, October 4th. Prominent men have been obtained with extensive clinics and lectures, the committee having gone to considerable labor in arranging a well balanced program. All ethical men are invited.

H. E. SCHEDINE, *Secy.*,
Lima, Ohio.

Indiana State Board of Dental Examiners

Next meeting of the Indiana State Board of Dental Examiners will be held at the State House, Indianapolis, November 12-17, inclusive. Applications and other information may be obtained by addressing H. C. McKittrick, Secretary, Indianapolis.

A Warning

The following letter sent to secretaries of state dental societies is self-explanatory and important:

"It has been brought to the notice of the government at Washington that men within the conscription age have made application to dentists to have teeth extracted to the extent of incapacitating them for military service. Orders have been issued to the state and local societies to inform the members that such cases are to be immediately reported to Dr. T. A. Broadbent, 25 E. Washington Street, secretary of Chicago Dental Society, giving name and address if possible of such persons.

"It is also demanded that men within the conscription age who have teeth extracted be prepared to produce the extracted teeth on request of the exemption board.

"Dentists who are guilty of extracting for this purpose will be prosecuted to the fullest extent by the Federal Government.

"Notify your members immediately upon receipt of this letter."

Fraternally yours,
T. A. BROADBENT, *Secretary*,
Chicago Dental Society.

Interstate Association of Anesthetists

The third annual meeting of the Interstate Association of Anesthetists will be held in conjunction with the Mississippi Valley Medical Association in Toledo, Ohio, October 9, 10 and 11, 1917. This will be one of the most important meetings in the Middle West this year, and all members of the allied professions who are interested in general and local anesthesia are cordially invited to attend.

There will be a special section on anesthesia for oral surgery and dentistry. In this connection it is interesting to note that the meeting of the Interstate Association of Anesthetists last July with the National Dental Association, resulted in establishing a permanent section on anesthetics in that organization.

Among the papers scheduled for the Interstate meeting in Toledo which will be of especial interest to dentists, may be mentioned the following:

"Further Researches in Blood Changes Under Nitrous Oxid-Oxygen Anesthesia," Theodore D. Casto, D.D.S., Philadelphia, Pa.

"The Value of Warmed Gases for Extraction and Minor Operations Under Nitrous Oxid-Oxygen," Paul Cassidy, D.D.S., Cincinnati, O.

"Low Pressure Nasal Administration of Nitrous Oxid-Oxygen Anesthesia," M. Ecker, D.D.S., New York City, N. Y.

"Selective Anesthesia for Hazardous Risks and Difficult Oral Procedures," Thomas C. Aller, D.D.S., Philadelphia, Pa.

"Vapor Anesthesia With Special Reference to the Use of Ether-Oxygen in Oral Surgery," John J. Buettner, M.D., Syracuse, N. Y.

"High Pressure Anesthesia for Cavity Preparation," W. T. Jackman, D.D.S., Cleveland, O.

"Methods of Local and Conductive Anesthesia for Oral Surgery," Arthur E. Smith, D.D.S., Chicago, Ill.

"Why Conductive Anesthesia Fails," Rich. Riethmuller, D.D.S., Philadelphia, Pa.

"Vapor Anesthesia for Oral Surgery," Jos. C. Beck, M.D., Chicago, Ill.

Other papers on general subjects will also be presented.

Headquarters, sessions and exhibits will be in the Hotel Secor, where the annual dinner will also be served on the evening of October 9, at $2.00 a plate. Bring the ladies to lend grace and charm to the occasion.

The committee on arrangements of the joint meeting, headed by Dr. Willard J. Stone, is making elaborate preparations for assuring all those in attendance a good time. For further information, dinner reservations or membership, address,

F. H. McMechan, M.D., *Secy.*,
Avon Lake, Oh o.

NATIONAL DENTAL ASSOCIATION ANNOUNCEMENTS

Twenty-first Annual Session

New York City, October 22, 23, 24, 25, 26, 1917.

All sessions of the Board of Trustees, House of Delegates, General Sessions, Section Meetings, Clinics (except surgical clinics), exhibits, will be held in Hotel Astor.

The following additions may be announced to the program as already published:

Monday, October 22nd: Registration, Laurel Room, first floor. First session, Board of Trustees, 11:00 A.M. (Rose room, first floor).

House of Delegates: Opening session, 2:00 P.M. All sessions of the House of Delegates will be held in the Rose room, first floor. Second session, Board of Trustees, 4:00 P.M. (Rose room, first floor).

FIRST GENERAL SESSION

Hotel Astor (Grand Ball room, first floor).

Tuesday, October 23rd, 9:00 A.M.: Invocation. Address of Welcome, Gov. Charles S. Whitman, on behalf of state, Albany, N. Y. Mayor John P. Mitchel, on behalf of City, New York City. President's address, LaFayette L. Barber, Toledo, O.; Oration, E. C. Rosenow, M.D., Rochester, Minn.; a research member of the Memorial Institute for Infectious Diseases, Chicago, and professor of experimental bacteriology in the University of Minnesota and the Mayo Institute.

SECOND GENERAL SESSION

Tuesday, October 23rd, 8:00 P.M.: (Grand Ball room, first floor). Research Department, Pathological, Bacteriological and Clinical Studies: "Dental Caries," by Russell W. Bunting and U. G. Rickert, B.S., M.A. Work done in, and with the assistance of the University of Michigan. "A Study of the Pathology of the Peridental Membrane," by Frederick B. Noyes. Work done in, and with the assistance of the University of Illinois. "The Histopathology of Chronic Periodontitis and the Pathogenesis of Dental Root Cysts," by Thomas B. Hartzell and Arthur T. Henrici, M.D. Work done in, and with the assistance of the University of Minnesota. "A Comparative Study of Oral Focal Infections," by Weston A. Price and Milton J. Damlos, D.D.S. Research Institute Laboratories, Cleveland, Ohio.

THIRD GENERAL SESSION

Wednesday, October 24th, 8:00 P.M.: (Grand Ball room, first floor). Herbert L. Wheeler, chairman, New York City. Symposium: "Dental Surgery and Restorative Protheses in the European War;" "War Dental Surgery;" "War Dental Restorative Prostheses." It is expected that Mr. Robert Bacon, ex-embassador to France, will preside, and that the Surgeons General of both the army and navy will attend. A description of the work done in Europe will be given by one who has had experience there. It is anticipated that both the medical and dental professions will be represented. There will also be pictures of "War Surgery."

FOURTH GENERAL SESSION

Thursday, October 25th, 8:00 P.M.: (Grand Ball room, first floor). Oral and Dental Hygiene Mass Meeting, Charles H. Oakman, chairman, Detroit, Mich. "The Importance of Dental Infections as Related to Urinary Tract Diseases, with Particular Reference to Ureter Stricture and its Equelæ," Guy L. Hunner, S.B., M.D., Johns Hopkins University, Baltimore, Md.

RESEARCH DEPARTMENT

Wednesday, October 24th, 1:30 P.M.: "Root Canal Fillings," by John R. Callahan. Work done in, and with the assistance of the Cincinnati General Hospital. "Studies Upon the Bacteriology of Dental Caries," by Percy R. Howe. Work done in. and with the assistance of the

Forsyth Dental Infirmary. "Quantitative Determinations of Certain Organic Substances in Saliva and Their Relation to Oral Conditions," by John A. Marshall, M.S., D.D.S. Work done in, and with the assistance of the University of California. "Electrolytic Medication—Physiological and Dental Aspects," by Samuel E. Pond, B.H., A.M., and Weston A. Price, Research Institute Laboratories, Cleveland, Ohio.

Thursday, October 25th, 9:00 A.M.: Chemical and Metallurgical Studies. "Dental Cements," by Marcus L. Ward. Work done in, and with the assistance of the University of Michigan. "Progress of the Investigation of Mottled Enamel," by Frederick S. McKay, Colorado Springs, Colo. "Studies of Internal Secretions in Their Relation to the Development and Condition of the Teeth," by William J. Gies, M.D., Ph.D. Work done in, and with the assistance of the Columbia University. "The Relative Efficiency of Medicaments for the Sterilizing of Tooth Structures," by Matilda Moldenhauer, A.B., M.S., and Weston A. Price, Research Institute Laboratories, Cleveland, Ohio.

PREPAREDNESS LEAGUE OF AMERICAN DENTISTS

Tuesday, October 23rd, 1:30 P.M.: (College Hall, eighth floor). "The Relations of the Dental to the Medical Corps of the Army," by Victor C. Vaughan, M.D., ex-president of the American Medical Association, member General Medical Board of the Council of National Defense, Washington, D. C. "The Value of the Educational Work as Being Executed by the Preparedness League of American Dentists," by Frank M. Casto, Cleveland, Ohio. "Report of Sectional Units of League by States—A to N inclusive."

Thursday, October 25th, 1:30 P.M.: "Stereopticon Lecture on Fractures of the Bones of the Face." Synopsis: This lecture will include the consideration and treatment of gun-shot wounds, removing foreign substances, the sterilization of wounds, the proper adjustment of fragments and the means employed to mobolize them. In the treatment of injuries of the face, the primary step should be after removing foreign substances to establish as nearly as possible, asepsis. The use of grafts of bone, modeling compound, hard rubber and metals to replace lost parts.

"The Dental Ambulance in War," by George B. Hayes, Neuiely (Paris), France. "Report of Sectional Units by States—M to Z inclusive." An interesting preparedness exhibit will be shown, including dental ambulances, base hospital, field hospital and first-aid equipments; in fact, everything relative to the service of the Officers' Reserve Corps, Dental Section, and Red Cross Officers will be present to give instruction and information. The ambulances shown will be sent to France as the gift of members of the Preparedness League and appreciative patients.

ANESTHETISTS SECTION

Wednesday, October 24th, 1:30 P.M.: (East Ball room, eighth floor). "The Teaching of Local Anesthesia," by Theo. Blum, New York City. "The Relative Toxicity of Local Anesthetics," by George B. Roth, Washington, D. C. "Cause of Failure and Untoward Sequelæ in Conductive Anesthesia," by Richard H. Riethmiller, Montclair, N. J., illustrated by moving picture film.

Thursday, October 25th, 9:00 A.M.: "After-Pain in Local and General Anesthesia," by A. E. Hertzler, Kansas City, Mo. "General Anesthesia for Oral Surgery," by Herbert A. Potts, Chicago, Ill.

STATE SOCIETY OFFICERS SECTION

Wednesday, October 24th, 9:00 A.M.: (College Hall, eighth floor). "Post-Graduate Course," by B. L. Shobe, Tulsa, Okla. "State Legislation from a Dental Standpoint," by A. H. Reynolds, Philadelphia, Pa. "Taking an Invoice of Our State Societies," by Otto U. King, Huntington, Ind.

Wednesday, October 24th, 1:30 P.M. "Organization," by J. P. Luthringer, Peoria, Ill. Symposium: "Method Used in Handling the Mid-Winter Dental Clinic, Atlanta Dental Society," by Thomas P. Hinman, Atlanta, Ga.; S. M. Cameron, Philadelphia, Pa.; Benjamin Sandy, Minneapolis, Minn.; Henry L. Whipple, Quincy, Ill. These papers will be limited to ten minutes each, and followed by general discussion.

R. OTTOLENGUI,
Publicity Committee.

SUGGESTIONS

Conducted by F R. Chapman, M.S., D.D.S., Comumbus, Ohio

(To Our Readers Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Bldg., Columbus Ohio.)

Use Hot Water When Grinding

On grinding down a tooth with a stone, always use water as hot as patient can stand to avoid causing heat.

—*F. H. Orton, per C. A. Kennedy, Oral Health.*

To Keep Flasks Clean

A small piece of zinc placed at the bottom of the vulcanizer will greatly assist in keeping flasks clean.—*W. A. Love, Commonwealth Dental Review.*

Sandarac Varnish

Sandarac varnish for temporary tooth dressing may be made more permanent and freer from septic conditions by adding ten drops of carbolic acid to a solution of thick syrupy consistency.—*W. F. Lewis, Oral Hygiene.*

Emetin—again

Whether emetin serves as an amœbicide or only a stimulant to better cellular activity, normalizing metabolism, the results obtained are indicative that in cases of pyorrhea of this class, diagnosed by the presence of the endamœba buccalis, we have yet to find a better medicament for furthering its cure than emetin.—*Chas. Keyes, Dental Cosmos.*

How to Secure a Correct Lateral Movement of Mandible

When a patient is requested to chew on a wax model, the movements of the jaw are conscious movements and will be almost certain to indulge in a wider range of movement than is normal. On the other hand, if the root or gums are sensitive, the patient consciously or unconsciously will favor that particular area. Ask the patient to "grit the teeth" from side to side; you will avoid calling attention to any particular tooth or area.

—*F. H. Orton, per I. H. Ante, Oral Health.*

An Efficient Crown Holder

There are many crown holders on the market that are intended to hold the shell crown while it is being polished. I find that a very good holder, in fact, the best to my mind, can be made by cutting an ordinary pine stick of the desired length and smaller than the inside of the crown, and melting some impression compound upon either or both ends and while still plastic, shove the crown to place. Squeeze off the surplus compound and you are ready to polish the crown with the assurance that it is not going to be disturbed. If heat is not generated by the polishing, the crown will remain firmly mounted during the operation.—*F. W. Frahm, Pacific Dental Gazette.*

Home-made Matrix

A strip of thin annealed copper, 36 gauge (B. & S.), is cut to almost surround the tooth, and after turning up a small loop at each end to engage the ligature, adjust and tie in place. Fastening the ligature to the matrix in this manner facilitates handling of both and prevents displacement of either. A coating of Caulk's Cavity Lining binds the several strands of ligature still more firmly together. Another advantage of the copper matrix is that it may be left in position between appointments, if for any reason this is deemed necessary.—*Dental Quarterly.*

To Remove Impression

In taking plaster impressions of edentulous upper cases, I make a hole in the perpendicular portion of the tray, at about the position of each first premolar. Through these holes I place a piece of string, leaving a loop across the palate, and then take the plaster impression in the ordinary way. After the plaster gets quite hard I raise the lip and force a little water from a syringe over the top of the plaster above where the string is hanging, and then, with a steady, strong pull on the string hanging at the side of the tray, I find I can pull the plaster away from the palate, rarely fracturing it at all. This avoids the difficulty of pulling away the plaster with the tray, or what happens more frequently, pulling the tray away from the plaster, and the plaster model having to be removed afterward.—*I. Clifford, Dental Cosmos.*

An Easy and Simple Method of Repairing a Crown or Bridge with a Broken Pin Facing

Take measure from center to center of pins left in the backing, and from the pins to incisal edge of backing and select a new facing with pins to match the measurements and of about the size of the broken facing in other details. Place the convex part of this facing in a small amount of plaster, and when well set, cut the pins off flush with the porcelain. Add a little oil and with a small drill in the headpiece cut out the balance of pins left in the porcelain. An inverted cone bur and some carborundum powder from the lathe will quickly clean out all metal and enlarge the holes slightly. Reduce the heads of the old pins left in the backing, and grind the facing carefully to adjust it to form of first facing, trying it in the space to be repaired frequently. When shaped roughen porcelain and cement to place.—*Chas. S. Hart, Dental Review.*

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

LACONIGRAMS

Put the imperial public-opinion factory out of business and the German people would promptly put imperialism into the discard. In no country on earth is public sentiment so completely controlled. Doctors, lawyers, professors, scientific men of all sorts, preachers and teachers all aid in the production of deception in the minds of the people. It is likely that the world never has known so complete a machine for the hoodwinking of an otherwise intelligent and fairly well-meaning people. Change this condition and the war will die a natural death. Tell the people the truth.

In view of the shameful dilatoriness of Congress in the matter of necessary war legislation, one could almost bring himself to wish for a little temporary dictatorship at such times. If we lose the first stages of the war, we shall have only Congress to thank for it.

A little less advice and a little more action would be a relief.

The Northwestern Indiana picnic at Grand Beach July 31, was an outstanding success. It would be hard to imagine a spot better adapted to the purpose. The sand dunes of northern Indiana show what nature can do when she plays; the sight and near contact of them suggests play in a man not too old to remember his youth. I am indebted to Dr. Bob Gillis for many courtesies, not the least of which was the invitation to spend the day with him and the other good fellows out there.

It is a little hard for me to understand the workings of the mind of the so-called conscientious objector. As I see him, he is a sort of troglodyte who would rather see his country go to smash under the heel of a conscienceless invader than hold his private opinions to himself during times of national stress. Reminds me of the Chinaman's definition of the hop-toad: "When he runny he hoppy; and he hain't got a tail worth a hardly."

Let's agree to talk less and do more.

The world is about to witness the death of autocracy—of government by divine right, choked to death in its own vomit.

There is still room for a few more in the gallery of has-beens. The seats reserved for ex-kings and ex-emperors will be found just behind the post in the last row.

Physical examinations under the selective draft law are revealing some startling facts with regard to the inefficiency of the average young man. It seems high time that universal training of some sort were made compulsory, unless we are willing that our descendents should descend rather than ascend.

Good, sound minds are all very well; wish we had more of them; but a sound mind in an unsound body is about as useful as a piano in an abandoned shell-hole. Know all you can, by all means; but knowledge, without the ability to express it in efficient acts for the accomplishment of some useful purpose, has no more power than a canary bird in a saw-mill.

There should be but one basis for dental fees, and that basis Service to the Patient. Once there was a dentist who advertised "Painless Dentistry." Patient raised an awful holler, and reminded him of his sign. Dentist replied, "Why, it didn't hurt Me a bit!" Wonder how many ethical men are performing operations for their own benefit?

Notice more discussion of the amalgam problem anent fees. Get the cost of materials out of your head and you will find no difficulty with the rest of the problem. Use amalgam whenever and wherever indicated. Your duty is to render the best service possible to the patient, and to make your fees commensurate with services rendered. An amalgam filling often is worth more than a gold one possibly could be. You are not selling materials. You are rendering personal services, the cost of which should depend solely upon value to the patient. Get that?

Look out for the Republic of Poland. None of the assorted Nobodies offered as ruler by the Huns seems to satisfy enlightened public taste. Take a good look at the phiz of his anticipated majesty the Crown Prince, and you will know why.

The Kaiser is so anxious for peace that he keeps busy offering to give away almost everything that doesn't belong to him.

If all the contributions that this country has made to the war, morally and physically, had been on the side of our allies, the war would have been over a year ago. Take, for instance, these three items only: the submarine, the aeroplane and the machine gun.

Good news for the Kaiser: Bumper crops all over America; almost a failure in Germany. Got mit uns!

Exploding pencils, germ-laden sugar for horses and anthrax and tetanus-infected court plaster are reported as Prussia's latest contribution to kultur. Got strafe kultur!

At the battle of the Marne, France lost nearly 5% of the troops engaged. That average has been so reduced that the last great offensives have cost only about 1.28%. That is, about one and a quarter men are put out of business in any one engagement. Everybody isn't killed in every battle.

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXVII October, 1917 No. 10

We Publish the Proceedings of the Following Societies:

The Ohio State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
Iowa State Dental Society
Texas State Dental Society
Tennessee State Dental Society
Section on Stomatology—American Medical Association
Interstate Association of Anesthetists
and Several Local Dental Societies

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L. P. Bethel, M.D., D.D.S., Editor-in-Chief

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REGULAR CONTRIBUTIONS

ROENTGENOGRAPHIC AND MICROSCOPIC STUDIES OF TISSUES INVOLVED IN CHRONIC MOUTH INFECTIONS*

BY ARTHUR D. BLACK, A.M., M.D., D.D.S., CHICAGO

THE IDEA that mouth infections often cause serious secondary effects has, in recent years, become definitely crystallized in the minds of physician, dentist and layman. Clinical observation has been supported by careful laboratory investigations. It is now generally recognized that a chronic suppurating focus may lead to any one of a considerable group of diseases, most of which are insidious in their development and extremely chronic in their progress. The chronic focus is therefore properly considered a menace to health, and its removal is demanded. The dental profession is thus confronted with a most serious problem, so serious that the practice of dentistry must be to a considerable extent revolutionized for its solution. The chain of causes and symptoms leading up to these mouth lesions and the peculiar physiologic relationships between the tissues involved, present complex problems which have been but partially solved. There are, however, certain outstanding features, the clear recognition of which should form a basis for future study.

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*Chairman's address, read before the Section on Stomatology (A. M. A.), of which The Dental Summary is the representative organ for the dental profession.

The normal person should have thirty-two teeth. At 21 years of age the average number of teeth is about thirty; at 60 years this number has been reduced to possibly ten on the average, many having lost all. With few exceptions the loss has been the result of chronic infection, either alveolar abscess or chronic pericementitis. On the average, each person loses a tooth every year and a half or two years, the number increasing with advancing years, each tooth having been a source of chronic infection for from one to five or ten or fifteen years, so that a large percentage of persons are not free from infection involving the maxillary bones from 20 years of age until death, or until all the teeth are lost. It is safe to say that fully fifty per cent. of persons 25 years old have infections which have destroyed areas of the bone about the teeth sufficiently to be easily detected by Roentgenoscopy, and that this percentage gradually increases until it closely approaches one hundred per cent. in persons who are not edentulous at 50 years of age. The estimate made several years ago by Dr. T. L. Gilmer that seventy-five per cent. of adults would be shown to have chronic infections involving the maxillary bones is fully supported by statistics thus far gathered.

It would seem desirable to establish the element of danger to health which these infections represent. It is not possible, at this time, however, to express in figures the relationshp existing between these mouth foci and the systemic effects, because the same systemic effects may result from such a variety of sources. Mouth infections might be considered as causal in proportion of their percentage of occurrence to other original foci, although the defense of the various tissues attacked would doubtless modify such a calculation. It is certainly illogical to conclude that a particular systemic effect is due to a mouth focus unless all other sources have been eliminated. Without question, in many cases, several sources are acting simultaneously.

Apparently the resistance of a large percentage of persons is sufficient to give full protection for years, yet we must ever keep in mind the insidious development of the secondary effects and then ask ourselves if we can be even reasonably certain that one's health is safeguarded so long as there is definite evidence of infection in the mouth.

There are two points of initial attack and two entirely separate routes of progress by which chronic mouth foci become established. The chronic lesions themselves, however, have many characteristics in common. The one begins with dental caries, as a result of which the pulp of the tooth becomes involved directly or indirectly and an inflammation of the periapical tissues is established. The other begins as a gingivitis and progresses alongside the root toward the apex, involving the peridental tissues. In both, the destructive processes include the peridental membrane, the bone of the alveolar process and the cementum covering the root of the tooth.

In view of the high prevalence of both forms of these lesions in adults, and of their extreme chronicity and intractability to treatment, to which reference will be made later, our hope for the future lies principally in prevention, and it is this which calls for radical changes in dental practice. Dental caries must be prevented or so treated that there will be the highest possible degree of pulp conservation. This means broader education of the public, and especially of children, to the need and means of better care by themselves, as well as more frequent and regular observation and treatment by the dentist. The dentist must follow more scientific lines in all operations better to control caries, and so to prepare and fill cavities that the pulps will remain vital. Gingival irritation must be reduced by better cleanliness by the patient and there must be improvement of technic in both operative and prosthetic procedures by the dentist so that there will be no irritation, either by margins of fillings, crowns, etc., or by food impaction as a result of faulty forms or tooth contacts. While these are simple statements which are readily accepted by all, their adoption in practice can come about only as a result of a fuller appreciation by dentists generally of the pathologic problems involved, both at the original foci and in the remote after-effects.

The changes which take place in the peridental tissues, as inflammatory processes progress to the establishment of chronic foci, represent the normal reaction to chronic irritation accompanied by infection, plus certain changes in the specialized elements of these tissues. Noyes[1] has recently shown that the principal route of travel of the infections beginning in the gingivæ is by way of the perivascular lymphatics. He called attention to the fact that, in cases of gingival irritation caused by deposits of salivary calculus, the vessels of the gum tissue are followed and the destruction of the bone of the alveolar process is from the gum side. This explains the previous clinical observation of Black[2] that deposits of salivary calculus do not, as a rule, cause the formation of pockets alongside the roots of the teeth.

In cases of chronic pericementitis, the blood vessels which lie within the peridental membrane are followed. As the course of these vessels is mainly in the direction parallel to the long axis of the tooth, we have an explanation of the more rapid progress of these infections toward the apex, as compared with their progress laterally around the root, resulting in deep, narrow pockets. The fact that chronic alveolar abscesses do not cause a similar destruction of the peridental membrane in the opposite direction is also explained, as the movement of the lymph is from the gingivæ apically.

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1. Noyes, F. B.; Studies of the Pathology of the Peridental Membrane, *Jour. National Dental Association*, April, 1917, p. 375.
2. Black, G. V.; Special Dental Pathology, p. 100.

Many specimens[3] of the tissues overlying these pockets, some including the teeth and all of the surrounding structures, studied in the research laboratory of Northwestern University Dental School during the past five years, show the changes which have been described by Talbot, Noyes and others. These include the thickening of the walls of the vessels to the point of obliteration, with the gradual disintegration of the surrounding tissues until apparently necrotic areas are formed, the tissue taking the ordinary stains poorly or not at all. These areas involve both the soft tissue and the alveolar process. Eventually the peridental membrane seems to be severed for a space, leaving a portion attached to the cementum of the root and a portion attached to the alveolar process. Areas of absorption of the cementum appear in many specimens; these apparently occur early, as a response to the irritation caused by the approaching destructive process. Later the tissue remaining attached to the cementum dies and disappears, leaving the cementum entirely denuded. The cement corpuscles also die, and the cementum becomes a necrosed, pus-soaked tissue.

The peridental fibers attached to the bone are similarly destroyed, and the bone is also invaded, areas being hollowed out along the lines of the vessels. Black[4] called attention to the fact that we might expect the fibers of the peridental membrane and the alveolar process to disappear, as a purely physiologic process of absorption, following the severance of the membrane from the cementum, regardless of the continued progress of the pathologic invasion. Doubtless both processes are factors in most cases.

The role which the gingival epithelium plays in these cases is extremely interesting. Many specimens show extensive projections deep into the submucous tissues and into the bone itself. Cross sections of these projections frequently show the cells in concentric rings, suggesting epithelioma. A growth of epithelium down into the pocket is frequent, apparently an attempt to line the pocket and protect the connective tissue. We have also noted, in cases in which the overlying tissue is cut away, exposing the denuded root, that the epithelium of the gum tissue will not only cover the cut surface, but also grow down to the line of attachment to the cementum, thus forming a new gingiva.

Practically the same changes take place in chronic alveolar abscess, except that the progress along the surface of the root is slower, is more likely to include the entire circumference, and a cavity is formed in the bone corresponding to the area of detachment of the cementum. The bacteriology of these cases has been studied by Gilmer[5] and reported in several papers. The bacteriology of the pus pocket is more complex, and will probably never reveal a specific organism. The paper read before this section last year by Lescohier[6] gives practically all available information.

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[3] Specimens prepared during the past year by E. H. Hatton, M.D., research investigator, Northwestern University Dental School.

[4] Black, G. V.; Special Dental Pathology, p. 168.

[5] Gilmer, T. L.; Chronic Oral Infections, *Arch. Int. Med.*, April, 1912, p. 499. Gilmer, T. L., and Moody, A. M.; A Study of the Bacteriology of Alveolar Abscess and Infected Root Canals, *The Journal A. M. A*, Dec. 5, 1914, p. 2023; *Oral Health*, February, 1916.

[6] Lescohier, A. W.; The Bacterial Findings and Their Relationship to Pyorrhea Alveolaris and Interstitial Gingivitis, *The Journal A. M. A.*, Feb. 10, 1917; p. 414.

As has been pointed out prominently before, the denuded cementum is the factor of prime importance in maintaining the chronicity in both groups of cases. A pus-soaked tissue, analogous to necrosed bone, except that it cannot be exfoliated, it defies reattachment of the adjacent tissue and remains as a continuous irritant. The prompt healing of these areas following the extraction of the teeth is sharp evidence of the role which the cementum plays. While the invasion of the surrounding soft tissues by infection is of the greatest importance in considering these areas as a menace to health, it is of very little consequence so far as healing is concerned. The infection is quickly eliminated by the tissues when the irritant—the cementum—is removed.

During the past year I have had Roentgenograms made of all the teeth and adjacent bone for about four hundred persons, for the special purpose of determining the frequency and extent of the infections of the maxillary bones. It was realized that most Roentgenograms are taken because of a definite indication; consequently they do not represent average conditions. In order that these might represent as nearly average conditions as possible, the persons were selected from several sources, and most of them without previous inquiry as to mouth conditions or general health. About one hundred and seventy-five are of the mouths of members of the senior class at Northwestern University Dental School, a few were patients of the school, a few were patients of other dentists, a few were selected from the files of Dr. Leach, who did the Roentgenographic work, and a limited number were my patients.

For persons under 40 years of age, the figures presented probably represent very nearly average conditions. We were able to select from these Roentgenograms a group of thirty full mouth examinations for persons, most of whom had the full complement of thirty-two teeth, which show no infection whatever of the maxillary bones, and not one of these thirty persons had had a single pulp of a tooth removed. The three hundred films of this group are mounted on a single sheet of celluloid and make an interesting study.

For persons over 40 years of age we were not so fortunate in securing a large majority who did not present evidence of infection before the Roentgenograms were ordered. Therefore, they show a percentage of infection above the average.

The accompanying table was made from three thousand Roentgenographic films of the teeth and adjacent bone of the mouths of three hundred adults.[7] In each case ten small films were made. The tabulation includes the age, systemic symptoms, number of teeth, disease of the peridental membrane as indicated by destruction of bone alongside the roots, alveolar abscess as indicated by destruction of bone at the apexes of roots, the number of teeth having good or poor root-canal fillings with the number of abscesses in relation to each group, and the number of teeth without root fillings which were abscessed.

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[7] Three thousand, three hundred Roentgenographic films, on celluloid mountings with illuminating box, were exhibited in connection with the presentation of this paper. These films were prepared and mounted by F. D. Leach, D.D.S., Roentgenographer, Northwestern University Dental School, and his assistants.

TABULATION FROM 3,000 ROENTGENOGRAPHIC FILMS, OF TEETH AND ADJACENT BONE IN MOUTHS OF 300 ADULTS*

Age	Number	Systemic Symptoms				Average number teeth per person	Peridental Membrane			Alveolar Abscess			Summary		Root Fillings				Large Canals				Small Canals				Alveolar Abscesses			
		No History	Negative	Complaint of occasional muscular or joint symptoms	Well defined cases, arthritis, nephritis, appendicitis, etc.		Number of persons, some bone destroyed at sides of roots	Percentage having bone involved	Average number of abscesses per person	Number of persons, some bone destroyed at apexes of roots	Percentage having bone involved	Average number of abscesses per person	Number of persons having peridental or apical infection or both	Percentage of persons having infections of maxillary bones	Number of persons having root fillings	Total number teeth with root fillings	Percentage of all teeth having root fillings	Number of root apexes not clearly shown	Number of good root fillings	Number abscessed with good root fillings	Number of poor root fillings	Number abscessed with poor root fillings	Number of good root fillings	Number abscessed with good root fillings	Number of poor root fillings	Number abscessed with poor root fillings	Total abscessed with root fillings	Number abscessed, no root fillings	Total abscessed	Average number of abscesses per person
Under 25	86	6	69	6	5	30	7	9	0.3	45	52	1.5	48	56	59	198	7.7	35	57	2	74	60	22	1	69	41	104	24	128	1.5
25 to 29	53	2	42	6	3	29	17	32	2.0	28	53	1.6	38	72	38	121	7.9	18	24	6	48	31	26	4	31	23	64	24	88	1.6
30 to 39	68	25	27	12	4	26	44	64	7.0	45	66	1.3	59	87	53	236	13.4	50	39	4	89	47	20	1	70	42	94	12	106	1.3
40 to 49	53	17	20	5	11	25	40	74	7.0	36	68	2.0	47	89	44	185	13.7	34	28	1	84	55	10	2	45	28	86	13	99	2.0
50 and over	40	18	4	5	13	23	37	92	11.0	22	55	1.5	40	100	28	111	10.9	15	30	0	43	32	17	2	27	20	54	6	60	1.5
Totals	300	68	162	34	36	27	155	51	5.0	176	59	1.6	232	77	222	851	9.0	152	178	13	338	225	95	10	242	154	402	79	481	1.6

Large Canals: Upper central incisor, cuspid, second bicuspid, lingual roots of molars, lower cuspid, first and second bicuspids, distal roots of molars.
Small Canals: Upper lateral incisor, first bicuspid, buccal roots of molars, lower incisors, mesial roots of molars.

SUMMARY OF ABSCESSES IN RELATION TO ROOT FILLINGS

			Number Abscessed	
Good root fillings, large canals	178		13	
Good root fillings, small canals	95		10	
		273		23
Poor root fillings, large canals	338		225	
Poor root fillings, small canals	242		154	
		580		379
Total		853		402

Percentage of abscesses for all root fillings, 47; for good root fillings, 8; for poor root fillings 65.

*In this tabulation the figures are probably very nearly correct as applied to all persons of ages below 40 years, as in the large marjoity, Roentgenograms were made without regard to indications. For persons of 40 years and over a considerable percentage of the Roentgenograms were taken because of definite indications of infection, and the figures given are therefor correspondingly at variance from average conditions.

The persons whose mouth conditions are tabulated were selected from various sources, as described in the paper, comparatively few being patients of the writer.

In order to secure as accurate information as possible as to systemic effects, it being impracticable to have a thorough physical examination in these cases, a questionnaire was prepared as follows: 1. Are any of the finger joints enlarged? 2. Has the patient noticed enlargement of other joints? 3. Have other joints or muscles been painful? 4. Is the patient anemic? 5. Is there inflammation of eyes, or impairment of vision, other than astigmatism? 6. Is there inflammation of nose, throat or tonsils? 7. Have there been attacks of appendicitis, ulcers of stomach, cholecystitis or other systemic conditions which might result from focal infection? 8. Does the patient complain of unusual nervousness or fatigue? On reviewing the answers the patient was entered as (1) negative, or (2) presenting occasional muscular, joint or similar symptoms, or (3) as having a well-defined case of arthritis, nephritis, appendicitis, etc.

Through a misunderstanding on the part of one of my assistants, this report of systemic symptoms was not secured for sixty-eight persons included in the tabulation. It is realized that three hundred cases would not have been sufficient to establish reliable data as to the relationship of these foci to systemic effects, and it is my intention to continue this study until several thousand persons shall have been examined. The statistics gathered so far are considered as forming a good basis for this work. It may be said now, however, that of those for whom histories were secured, there is a decided increase with advancing years which follows closely the percentage increase of mouth infections.

The average number of teeth per person is interesting. The tabulation shows thirty teeth per person under 25 years, twenty-nine per person of 25 to 30 years; twenty-six per person of 30 to 40 years; twenty-five per person of 40 to 50 years, and twenty-three per person over 50 years.

Destruction of bone about the sides of roots of teeth as a result of infections beginning in the gingivæ is shown to increase very markedly after the twenty-fifth year, there being nine per cent. of persons below 25 years having these pockets, and thirty-two per cent. for the ages from 25 to 30 years. For the succeeding decades the percentage increases to sixty-four, seventy-four and ninety-two. The number of pockets per month also shows considerable increase with age.

Fifty-two per cent. of persons under 25 years have chronic alveolar abscess, a much greater percentage than that of pus pockets alongside the roots in the same group. The abscess percentages do not increase as rapidly as the cases of chronic pericementitis, being fifty-three per cent. for persons from 25 to 30 years, sixty-six per cent. for persons from 30 to 40 years, sixty-eight per cent. for persons from 40 to 50 years, and only fifty-five per cent. for persons over 50 years. The smaller number for those over 50 years is evidently because of extractions.

A summary of those having either peridental infections beginning at the gingivæ or periapical infections, or both—persons who have infections involving the maxillary bones—gives rather astonishing results. The percentage is fifty-six for persons under 25 years of age, seventy-two for those between 25 and 30 years, eighty-seven for those between 30 and 40 years, eighty-nine for those between 40 and 50 years, and one hundred per cent. for those over 50 years.

The youngest person in the tabulation was aged 17 years, and there were but nine out of the eighty-nine in the group under 25 years of age who were under 21, so that the figures for this group might be considered as from 20 to 25. While no tabulation has been made for children, I think I am safe in stating that practically no infection of the peridental membrane beginning in the gingivæ will be found, and comparatively few chronic alveolar abscesses. Therefore, attention may be called to the fact that the tonsils are much more likely to be the seat of original foci in children.

Attention is again called to the fact that the figures for persons beyond 40 years are too high as average figures, especially for peridental infections, because the Roentgenograms for many of these, and especially for persons over 50 years, were taken because the patients presented themselves for consultation.

The tabulation of abscesses in relation to root fillings should be of special interest to dentists. The remark has often been made that Roentgenograms show many teeth with imperfect root fillings which are not abscessed, and such observations have doubtless supported continued carelessness in the technic of treating and filling root canals. For this study, the teeth are divided into two groups, those having large root canals, and those having small canals. The root fillings were classified as good or poor. A root filling was classed as good if it extended to or close to the end of the root, and if the filling apparently filled the apical portion of the canal. For some small canals, if the filling did not reach the root apex by 3 or 4 mm. and the canal could not be made out in the Roentgenogram beyond this point, the root filling was classed as good. I do not advocate this plan of treating small canals, but wish to impress the fact that I was liberal in classifying root-canal fillings as good.

Of the teeth with root fillings in large canals classed as good, but thirteen out of one hundred and seventy-eight were abscessed; in small canals, but ten out of ninety-five. This is eight per cent. Of those in large canals classed as poor, two hundred and twenty-five out of three hundred and thirty-eight were abscessed, in small canals one hundred and fifty-four out of two hundred and forty-two. This is sixty-five per cent. Could there be presented a better argument, a more imperative demand, for more careful technic in the treatment of root canals?

CONCLUSION

These suppurative detachments of the peridental membrane are in practically all cases permanent detachments, whether the detachment is at the side of the root or the apex. The area of bone destroyed about the apex of a root is not so important as the extent of the destruction of the peridental membrane. There is no hope of reattachment of the surrounding tissue to the root, and if such teeth are permitted to remain in the mouth—excepting those which are operated on by resection—it should be with the definite understanding that they necessarily continue as a menace to the health of the individual, and that the use of such teeth in mastication overbalances this menace to the health. In such cases we are using our best judgment as to the patient's general physical condition and his resistance. We must do this with the thought ever in mind that nephritis, endocarditis, cholecystitis and other secondary effects are so insidious in their onset that the condition is likely to be serious and the patient even beyond the possibility of recovery before it is discovered by the physician.

DISCUSSION

Dr. Thomas L. Gilmer, Chicago: To offset the great harm that is being done by infectious mouth foci, our methods of practice must be changed. I have no doubt, as the essayist has said, that mouth foci are blamed for many things for which they are not responsible. There are some dentists and not a few practitioners of medicine who are doubtless going too far in the wholesale removal of teeth. The physicians with whom I have been associated endeavor to eliminate all foci of infection, including the teeth, from all parts of the body. They realize that there are many other parts of the body beside the jaws which may be a cause of metastases. Pyorrhea specialists should take up the subject of pyorrhea in somewhat the same exhaustive way as has been done by Drs. Black and Noyes to determine what its pathology is. Then they may be able to offer rational treatment which will bring about a cure. No one should call himself a specialist unless he does this. Dentists have tremendous problems before them which will take the wisest and best among them to solve. I trust that they will go to work at once to discover the cause and cure of some of the more serious diseases of the mouth.

Dr. G. Alden Mills, New York: Dr. Black's analysis and research in this matter take me back to 1876 when I wrote the first articles that were published on this subject of Riggs' disease, except one by Dr. Riggs, and by these articles were initiated the studies on pyorrhea. I studied in sympathy as a student of Dr. Riggs. I had the value of his acquaintance and the value of his treatment on my teeth, and though 86 years old, I am happy to say that I have a good many teeth left. Dr. Smith, of Philadelphia has forced on the profession the question of prophylactic treatment. So we have now to say that prophylactic treatment is of immense help in the treatment of this disease.

Dr. E. P. R. Ryan, New York: The greatest thing about Dr. Black's paper is the information he has given us of the cases he has reported that are not, and cannot be blamed for systemic infection. Men working every day need some standardization of examination of the Roentgenograms that are made. We all have an isolated case here and there that we lay to some systemic condition of the mouth; but what the man in practice wants to know for making a rational diagnosis is, what is the percentage of those cases? We can extract all the teeth in the mouth, but this is not good dentistry, and that is not going to cure the disease. I think the suggestion of the examination of the normal teeth as well as those diseased, and determination of the relative percentages, should be accepted, and some means devised whereby we can all make observations and report them, and arrive at some definite and precise conclusion.

Dr. Arthur Zentler, New York: As the paper of Dr. Black deals with the pathologic study of the tissues involved in infections of the mouth, I feel that it may be appropriate to report the divers findings in the examination of sections obtained in operating for eradication of such oral infections.

The picture seen in the photomicrographs prepared from pathologic laboratory slides is different when obtained from mouths of patients suffering from different types of general disturbance; for instance, arthritis, cardiac lesions; infection due to external trauma (a blow on the chin), which is relatively of acute character, apparently causing no general disturbance; still different when the infection is due to operative trauma, the infection being of long standing and in a patient of a special diathesis, for instance, tuberculous.

(The discussion was illustrated by lantern slides.)

DR. ARTHUR D. BLACK, Chicago: Among the films exhibited, there is a set of Roentgenograms of the mouth of a patient who was under the care of a so-called pyorrhea specialist. The radiographs show that the alveolar process has been destroyed nearly to the ends of the roots of the upper bicuspids and molars, and these teeth are apparently being held in place by orthodontia appliances, while they are scaled and treated. This case illustrates what I meant when I said the practice of dentistry needs to be revolutionized. Here is a mouth in which it is evident to anyone who has studied the problem of focal infections that the teeth should be extracted. There must be developed in the dental profession a sense of recognition of mouth infections before we can make real progress with this subject. The dental profession must recognize that such foci are a menace to health; then it will not be difficult to get action. The more I tudy these conditions the more I am convinced that more teeth must be extracted.

INVESTIGATIONS AS TO FREQUENCY OF METASTATIC EYE INFECTIONS FROM PRIMARY DENTAL FOCI*

(PRELIMINARY REPORT)

BY JOSEPH M. LEVY, D.D.S., NEW YORK

ASSISTED BY WILLIAM F. C. STEINBUGLER, M.D., BROOKLYN, AND MARSHALL CARLETON PEASE, JR., M.D., NEW YORK

IT MUST BE REALIZED that ideal research conditions cannot be obtained in investigations such as we are reporting on, for the reason that the ailments for which the patients are presenting themselves are of such a nature that we did not feel justified in eliminating all routine treatment, owing to the danger of possible irreparable damage due to delay, should the dental foci not be the etiologic factor.

In the course of the past year, fifty-seven patients with various eye conditions were sent to the dental department of the Herman Knapp Memorial Eye Hospital for dental treatment. The diagnosis in these cases and the results obtained were as shown in the accompanying table.

The general impression which has hitherto obtained is that these metastases occur through the blood stream, but our observations have led us to the conclusion that this belief is not substantiated by the clinical evidence. With one exception, all the patients cured or materially benefited presented dental infection on the same side as the affected eye. If the belief that these metastases occurred through the blood stream was correct, we feel we should have observed more cases in which cure or material improvement occurred, when the dental infection was on the opposite side from the affected eye. Failing to have seen such cases, we have been led to the conclusion that these eye metastases, occurring from primary dental foci, travel through lymphatic channels. We have recently endeavored to demonstrate the correctness or fallacy of this belief by means of animal experimentation, but unfortunately, the number of experiments carried out so far are too few to arrive at any conclusion. Animals injected intravenously or through lymphatic channels have all died without presenting any eye lesion whatsoever. We have been using rabbits for this work, but as they are particularly susceptible to streptococcus infections and succumb very readily thereto, we feel we shall have to secure animals less susceptible in order to carry on further investigation.

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*Read June, 1917, before the Section on Stomatology (A. M. A.), of which THE DENTAL SUMMARY is the representative organ for the dental profession.

DIAGNOSIS AND RESULTS IN FIFTY-SEVEN CASES

Diagnosis	Cases	Cured	Materially Improved	No Result
Chronic iridocyclitis	9	2	1	6
Acute iritis	7	1	4	2
Detachment of retina	5	..	..	5
Episcleritis	2	..	1	1
Choroiditis	10	1	2	7
Iridochoroiditis	2	..	..	2
Acute iridocyclitis	5	..	5	..
Vesicular keratitis	1	1	..	..
Keratoiritis	2	..	1	1
Postoperative iritis	3	1	1	1
Cyclitis	1	..	1	..
Corneal ulcer	2	..	1	1
Retrobulbar neuritis	1	..	1	..
Retinal hemorrhage	1	..	..	1
Chorioretinitis	1	..	1	..
Interstitial keratitis (nonspecific)	1	..	1	..
Neuroparalytic keratitis	1	..	..	1
Dendritic keratitis	2	1	1	..
Sclerosing keratitis	1	1	..	..
	57	*8	†21	‡28

*14 per cent.; †36.85 per cent.; ‡49 per cent.

Believing it may be of interest, we will briefly outline a few typical cases:

Case 1: C. B., man, aged 34 years, Dispensary No. 15267, presented himself February 2, 1916, with the history of blurred vision of the left eye for the past four days. He had had a similar condition a year previously and was treated at that time for choroiditis and glaucoma. On examination vision in right eye was 20/20, left 20/30. Vitreous opacities and choroidal patch in lower temporal region of the left eye. Diagnosis, choroiditis. Urinalysis was negative, as was also the streptococcus complement fixation. An examination of the nose and sinuses excluded them as possible etiologic factors. February 14, 1916, the upper right cuspid and second bicuspid were Roentgenographed, disclosing an apical infection about the root of the cuspid. This tooth was extracted and a culture made from the root end and the curettings from the socket. Culture gave *streptococcus viridans* as the predominating organism. February 19, 1916, five days after the extraction of the cuspid, vision was 20/20, and the eye was much clearer. It cleared up entirely in a short time and has remained so since.

Case 2: J. K., male, aged 24, Dispensary No. 23416, presented himself March 2, 1916, with a history of pain and inflammation in the left eye for one week. The patient gives the history of having had syphilis and gonorrhea recently. Has had considerable disturbance from one of the teeth in the upper left maxilla. Examination: vision R., 20/20; L., 20/30; conjunctival and ciliary congestion. The left pupil reacts sluggishly and the iris is greenish in color. Internally, the eye shows congestion of the retinal veins. The Wassermann and gonococcus complement fixation were negative; the streptococcus complement fixation, weakly positive. On March 7, 1917, a Roentgenogram of the upper left maxilla showed an apical infection about the roots of the upper left first molar. On the following day this tooth was extracted and a culture made. The culture showed a pure growth of staphylococci from which the vaccine was obtained. The extraction of this tooth was followed by a slight reaction, the eye becoming somewhat redder. On March 14, 1917, the eye was almost white. On the 21st, the fundus examination showed a diminution of the venous congestion. He received two doses of the autogenous vaccine before he left our care, March 26, at which time the eye was white and only slight venous engorgement remained.

Case 3: W. R., man, aged 51, Dispensary No. 21026, presented himself October 27, 1916, with a history of redness of the upper lid of the left eye of one week's duration. Examination showed vesicles of forehead and upper lid. The eye was normal. The patient was given aluminum acetate to apply locally in the form of a wet dressing. On November 20 he again presented himself with a history of failing vision of the left eye for two weeks previously. Vision, L., 20/40; the cornea shows an opacity nasally and below and is anesthetic. B. P. 160. The Wassermann reaction was negative, the streptococcus fixation weakly positive. Examination of the teeth revealed a severe pyorrheal condition of the six lower incisors, the only teeth remaining. The extraction of these teeth was advised, but this the patient refused to have done. On November 24 his vision had fallen to 20/100. On December 4 all the teeth were extracted; at this time the vision was 20/200, and the cornea was hypesthetic. From now on, his condition gradually improved until, on December 27, the cornea was no longer anesthetic and the eye was almost white. On January 12 the eye was white, the vision was 20/40, and showed only a faint macula as the remnant of the inflammation.

Case 4: M. S., woman, aged 27, Dispensary No. 15743, previously presented herself February 26, 1916, with a history of having had the grip two months prior to coming to the dispensary, following which the left eye became painful. She is married, has three children, has never aborted and is otherwise normal. Examination: vision, R., 20/20; L., 20/70. The right eye shows four nodules of episcleral and possibly scleral infiltration. They are situated above and temporally, over which areas there is slight congestion. In addition to these nodules there is a vertical band of superficial opacity about $2\frac{1}{2}$-3 mm. wide, extending from the pupillary margin temporally almost to the center of the cornea, with a smaller band temporally. A Roentgenographic examination of her teeth showed apical infection about the roots of the upper centrals and about the root of the lower right second bicuspid. The roots of the upper centrals were filled and the ends amputated and the lower right second bicuspid was extracted. Cultures were made in both instances. The culture from the root ends of the centrals showed the staphylococcus to be the predominating organism. *Streptococcus viridans* and the pneumococcus were present. The culture from the bicuspid socket gave *streptococcus viridans* as the predominating organism. From this culture a vaccine was prepared. Patient received in all fifteen injections of the autogenous vaccine at intervals of seven to ten days. Following some of the injections there was a slight reaction in the form of backache, headache and an increase in the local redness. When this occurred the dose was diminished. In June, four months after her first visit to the clinic, her vision had increased to 20/20 and the nodules were very much smaller. The nodules subsequently disappeared and the opacity became fainter.

Case 5: F. A., woman, aged 44, Hospital No. 19183, presented herself September, 1915, with a deep keratitis of the right eye, for which the etiology could not be found. She gave a positive reaction with tuberculin but treatment with tuberculin did not improve her condition. Thyroid tablets were also given without result. She was treated in this manner until December 12, 1915, when a Roentgenographic examination of her teeth showed apical infection about the roots of the lower first molars, the upper left first and second bicuspids and the upper right cuspid and second bicuspid. On the following day the lower left first molar was extracted and on the fifth day following, the root of the upper right cuspid was filled and the end amputated. A vaccine was prepared from a culture taken at the time of the root amputation. She was given this autogenous vaccine and her condition gradually improved. Two weeks following the root amputation, the eye was clear and the pain had completely subsided. When last seen in October, 1916, her vision was normal and there were only a few deposits remaining marking the site of the old infiltration.

Case 6: W. J., man, aged 71, Hospital No. 19898, was operated on for a mature cataract of the left eye June 20, 1916. The second week the eye became inflamed. Patient had recurring attacks of iridocyclitis, sometimes with the development of hypopyon. The Wassermann and the streptococcus complement fixation were negative. On July 6, 1917, the upper left bicuspid (first) and upper left first molar were removed. This was followed by considerable local improvement. The patient subsequently had two more attacks of iridocyclitis. On August 21 a Roentgenographic examination showed abscesses about the upper left second bicuspid, lower left first molar, upper right first and second bicuspids and upper right lateral. Later the lower left first molar was removed and a culture made from the socket gave a pure growth of *streptococcus viridans.* Following the clearing up of these dental foci, the eye improved and no further iritis occurred.

Case 7: J. S., man, aged 42, Hospital No. 20251, presented himself November 3, 1916, with the history of having taken "cold" two to three weeks previously, following which the right eye became red and discharged pus. He continued at his work and did not consult a physician until the day before admission to the hospital. An examination of the secretion from the conjunctival sac was negative. A grayish infiltrate, irregular in outline, ran across the lower half of the cornea, somewhat dendritic in shape. The cornea was hypesthetic. The streptococcus complement fixation was negative. On November 13, 1916, Roentgenographic examination showed abscesses about the roots of the right central, lateral, cuspid, first bicuspid, first and third molars, also the upper left central. All these teeth were removed. Following the extraction, the patient made a rapid improvement and was discharged cured.

Case 8: E. O'R., man, aged 22, Dispensary No. 22729, presented himself January 29, 1917, with the history of an acute inflammation of the left eye of three days' duration. The history was negative, with the exception that the patient had had a severe cold just before applying for treatment. The patient admits having poor teeth. Examination gave vision R. 20/100, L. 1/200. Pupil narrow, anterior chamber filled with exudate. Urinalysis negative; Wassermann and gonococcus complement fixation negative; streptococcus complement fixation +. Patient did not improve under the usual treatment for acute iritis. A Roentgenographic examination of his teeth revealed abscesses of upper left first bicuspid, first molar, lower left third molar, upper right first bicuspid and first molar. These teeth were extracted and there was an immediate improvement in the condition of the eye, the vitreous, however, still remaining hazy. At the time of discharge the patient's vision had increased to L. 20/100, and the vitreous had cleared up considerably.

Case 9: W. O'C., woman, aged 27, Dispensary No. 22024, presented herself December 21, 1916, with the history of having had an attack similar to the present one, in both eyes, at the age of 13. For the last five months the left eye had been bothering her. She complains of poor vision, redness and photophobia. The family and the personal history are negative. Examination: vision, R., 20/40; L., 20/100. The left eye shows numerous opacities, eight or nine in all, of irregular size and shape in the substance of the cornea. Some of the patches are white, others grayish. The Wassermann reaction, urinalysis and examination of the nose proved to be negative. Patient was given 1 mg. of tuberculin T. O., but did not react. A Roentgenographic examination of her teeth showed abscesses over the upper left lateral and first bicuspid, also about the lower left first molar, right first bicuspid and upper right third molar. On December 23 the roots of the lower left first molar were extracted and on the 26th the upper left lateral and first bicuspid, upper right second bicuspid and third molar were extracted. Patient's condition did not improve until some time later. Six weeks after extraction of the teeth the vision of the left eye was 20/40 plus, and the cornea was decidedly clearer.

Case 10: M. J., woman, aged 30, Dispensary No. 19480, presented herself August 12, 1916, with the history of having had pain in the right eye for two weeks. Patient says she had a previous similar attack in 1903, at which time she was treated for eleven weeks. The Wassermann reaction was + + + +. Later the left eye became involved, and she was admitted to the hospital on November 10, 1916. She did not improve under the routine treatment for cases of specific iridocyclitis, which treatment included mercurial inunctions and injections. On November 19, a Roentgenographic examination of the teeth showed apical infections about the roots of the upper right lateral, second bicuspid, lower right third molar, upper left central, lateral first bicuspid, upper and lower left third molars. All these teeth were extracted, giving almost immediate relief from pain. The patient from then on made a rapid and uneventful recovery.

It will be noted that a fraction over fifty per cent. of the cases were either cured or benefited by dental treatment. It is not meant that the conclusion should be drawn that fifty per cent. of infectious eye conditions will be benefited or cured by dental treatment, but that when dental infection is present, coincidentally with an infectious eye condition, there is a strong probability that the dental foci may be a material etiologic factor.

We would again call attention to the fact that in all but one of the cases enumerated, dental infection has been on the same side with the affected eye.

Owing to the fact that the usual dental examination is of a very perfunctory nature, it is perhaps not out of place for us to warn the ophthalmologist to satisfy himself that a careful Roentgenographic examination has been made of all suspected teeth before excluding them as a possible etiologic factor in infectious eye conditions.

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DISCUSSION

Dr. Meyer L. Rhein, New York: I do not agree with Dr. Levy in regard to the deduction he makes from the complement fixation test. He says he places very little reliance on a small positive result. This is not at all in conformity with my own clinical experience with this test.

As mentioned elsewhere, up to date there have been over 150 strains isolated, and we do not know at present how much further these strains may go. Consequently a negative streptococcus fixation test does not necessarily prove that there is not a streptococcus infection by a strain that has not been used for comparison. I have been using the test extensively for a year and a half, and my own clinical deductions are that even a small positive test is of great diagnostic value. There is a great deal of uncertainty about it, but I do not think that it is fair to the test to draw the conclusions the essayist draws in his remarks. The one case he cites in which there was a negative test and in which staphylococci instead of streptococci were found, calls to our attention how frequently we may have this source of infection instead of the streptococcus, and of course if there is any great proportion of this form of infection, it presents an entirely different point of view relative to the complement fixation test and everything pertaining to it.

There is a strong possibility that both of these micro-organisms may be found; that is, in certain cases either one may be the attacking organism. I think this is a valuable form that investigations should take, and while it is of value, I feel that the investigator attached too much importance to the negative result of the fixation test.

Dr. Morris I. Schamberg, New York: I am not connected with any eye institution and have not observed as many cases as Dr. Levy. I have had probably five cases in the last two years, among which a most refractory recurrent iritis on the right side was directly attributable clinically to an infection on an upper left molar tooth, which might have escaped attention even with the help of the Roentgen-ray if I had not used common sense in conjunction with it. There was nothing to suggest rarefaction at the apex, or any evidence of infection. A shadow in the picture showed a large filling which appeared to project into the pulp chamber, and I assumed it was pulpless. After applying the thermal test I decided to remove the tooth to make a culture from it. After the removal of the tooth the eye cleared up, though it did not occur for some time.

Eye cases respond almost as rapidly without vaccine treatment as with it. In one recurring case vaccines were administered with very gratifying results. Another case of iritis in a woman, aged 86, defied treatment by the ophthalmologists and did not respond in any sense until I looked into the mouth. Nothing in the Roentgenogram indicated infection or deep-seated pyorrhea. I noticed, however, that there was an offensive breath and that the fold at the gingival border was rather deep. I used tincture of iodin and alcohol in equal parts, having the part sprayed three times a day, and had a nurse make applications to the eye, spraying forcibly into pockets a bland antiseptic, every half hour, and with that treatment the eye improved, though it had not responded until the mouth treatment was instituted.

I would sound a note of caution against the conclusion that the lymph channels are the means of transmission of infection to the eye. I believe the complement fixation tests and the blood cultures are just as uncertain as our findings in Wassermann examinations; in fact, I think more so. I feel that there is a great deal to be learned about these various tests, and I know that it is almost impossible, even though there are organisms circulating in the blood, for the average pathologist to recover them and grow them.

The same thing applies in connection with the test Dr. Levy proposed, the injection into the lymphatics. I am convinced that if autogenous vaccines are used in the blood stream, these antibodies formed will eventually reach the lymph channels, and if injected into the lymph channels they will reach the blood stream. I offer that as a suggestion.

Dr. Thomas L. Gilmer, Chicago: I should like to ask a question. As a preface to this question I would say that those of us who have made a study of the bacteriology of alveolar abscesses and made animal inoculations, have used the vein of the ear to introduce the organisms. As a result we have found ulcers in some organs and hemorrhages in many parts. In our work at St. Luke's Hospital we found as a result of such inoculations twenty per cent. of hemorrhages in the periosteum of the jaw, and about the same in the joints. Does this not seem to indicate that the organisms go directly through the blood stream?

Dr. James H. Kelsey, Erie, Pa.: I should like to make just a few remarks in corroboration of Dr. Levy's paper, and to mention one or two personal experiences that I have had in connection with teeth and eye conditions. Dr. David N. Dennis, a well-known oculist in Erie, and I have co-operated to some extent in the last year and a half, and I have been able to compile records on some fifteen to twenty cases of eye conditions that have been benefited by dental treatment. I have in mind a few patients who have definitely assured me of the connection between eye conditions and teeth conditions; in one case particularly, that of a young man about 18 years of age, who had a neuroretinitis, a rather bad case, a Wassermann test was found negative, the spinal fluid was taken, nose examined, the Roentgen-ray showed the sinuses normal, and so on; everything possible had been done until he was referred for dental examination and diagnosis. We found an upper right first bicuspid showing a small granuloma. To hasten results, on account of the severity of the eye condition, this tooth was extracted. The eye cleared within a few days. The rest of his teeth were examined and found apparently in good condition, but about three months afterward there was a recurrence of his eye trouble. Another thorough examination of his teeth disclosed a hidden cavity in the bicuspid on the opposite side from the one mentioned. The pulp was partially dead, and answered tests for both a vital and nonvital condition. I extracted that tooth and the eye condition cleared up again within two or three days. Since then, as I understand, there has been no recurrence.

In my experience eye conditions have had more to do, perhaps, with the ten upper anterior teeth than with any of the other teeth in the mouth. Another case was of a right central incisor with an apical infection that held a gold crown. The crown was removed and the tooth drained; within a few days the eye condition cleared. I left the tooth open, and later closed it up, thinking perhaps it was all right. I sealed it hermetically with cement, and within a day or two the same eye condition presented itself again. I removed that filling, drained it again and treated the tooth further, and in the last eighteen months there has been no recurrence.

In one case of eye trouble we found a pyorrhea pocket around an upper third molar and nothing else wrong. We made a vaccine from this pocket, extracted the tooth, curetted the socket and used this vaccine for some time, and with local eye treatment the condition cleared, but prior to that for some months the patient had considerable trouble, everything else possible having been done.

Dr. G. V. I. Brown, Milwaukee, Wis.: In this discussion it seems to me we are assuming that because there is iritis and an abscessed tooth, that *ipso facto*, the eye trouble must be the result of the infection. That does not follow at all. It may still come from the tooth, but it seems to me that the newer study of nerve conditions in that region supplies a very much more simple reason why my friend got a more direct result in the relief of his case than he could have expected from an infection, because he had a direct nerve relief. Later investigations show that there is a much more direct connection than has been thought between the ciliary ganglion and the fifth nerve, so that the tooth which was extracted might easily have supplied the cause and the correction; whereas no amount of investigation and no test, complement fixation or anything else, could have demonstrated that the iritis was the result of infection. I am not saying it was not, of course, but I do not think in this discussion we ought to ignore this newer study of nerve conditions and look fixedly on the side of infection all the time.

Dr. Joseph M. Levy, New York: I believe the last speaker might be justified if we were only discussing iritis, but I wish him to recall that we have other cases and other eye conditions which have responded to dental treatment. One thing I will say in substantiation of the statement made by the last speaker. No one, I believe, among all those investigating these metastatic eye infections has ever been able to produce a bacteriologic culture from tissue taken from one of these eyes, and only once has anybody ever claimed to have produced an experimental iritis by animal inoculation.

Whenever I have drawn the conclusion that the eye condition may have been due to a primary dental infection and that there had been an infectious process in the eye, it was because I have had the authority of Dr. Knapp and his staff at the hospital that such was the case. I am not drawing conclusions as to whether an eye condition is or is not due to either nerve irritation or infection, because I believe it is just as foolish for me to make a diagnosis about the eyes as for the ophthalmologist to make a diagnosis about the teeth. If the ophthalmologist turns a case over to me as an infectious eye condition, I have to accept his diagnosis. Whether or not this answers Dr. Brown I do not know.

In reply to Dr. Rhein's statement about the species of streptococci, I want to say that some of these streptococcus complement fixations were performed, using as antigens streptococci obtained from cultures made from the teeth and sockets at the time of extraction. We cannot, presumably, get closer to the original organism we want for an antigen than using the one from the culture made at the time of extraction. Of course, the conditions under which the cultures are produced are entirely different from those in the body, and there may be some difference in the organism itself when grown in culture than when grown in the body. If we take a culture from a tooth which we believe is producing an infectious condition elsewhere in the body and use it as an antigen for complement fixation, and the fixation result is negative, and we get a positive cure or material improvement from the elimination of this tooth, I think we are justified in concluding that the primary focus was where we believed, and the complement fixation showed there was no demonstrable toxin in the blood due to this organism.

Now as to Dr. Schamberg's statement about a recurring case of iritis in which he used a vaccine. If he made a careful Roentgenographic examination and eliminated the dental focus, where did he get his vaccine for this case? Did he use a stock vaccine?

Dr. Morris I. Schamberg, New York: I refer to the fact that a Roentgenographic examination proved negative until I used common sense in conjunction with it and decided to remove a pulpless tooth from which we took a culture.

Dr. Joseph M. Levy, New York: As to animal inoculations, most of the men doing animal experimentation seldom use less than 3 to 5 c.c. of a 24-hour culture. Their bacteria will probably run up to 100,000,000 to the cubic centimeter. Rosenow uses colossal quantities, 15 to 30 c.c. We do not get anything like this in the human being. What we get, or what we have been led to believe we get, is a slow, gradual but constant inoculation with the active virus from the original focus. What we are trying to produce in our animals is a similar condition. If we give massive inoculations our rabbits promptly go to post mortem. We are trying to produce these slow but constant injections, simulating the conditions we find in the human subject, and see what results will be obtained. We have had the usual results obtained by other experimenters as to cardiac, arthritic and other involvements, but to date we have been unable to produce an experimental infectious eye condition.

A REVIEW OF THE PROGRESS OF DENTISTRY*

BY CLYDE M. GEARHART, D.D.S., WASHINGTON, D. C.

AGREEABLY with the suggestion of our society that the annual essayist direct his remarks along the lines suggested by the title, it becomes my pleasure to present a brief resume of the progress that has been made by the dental profession during the past year.

If at any time there has been a prejudice against ranking dentistry and medicine along side by side, that prejudice has been rapidly dissipated during the year. It may now be said that the successful doctor of medicine seeks collaboration with the doctor of dental surgery in many cases.

The application of the X-ray in matters dental, the use of which has become more universal during the year, has proven to be of inestimable value. It is to be hoped, however, that because of the great value of the radiograph we will not allow ourselves to abuse its use, as may be truthfully said of a few other innovations that have been placed in our hands. I may state as an irrefutable dogma that the radiograph is not a picture of disease. It is a record only of the varying resistance to the passage of the ray offered by the parts pictured. The interpretation of the meaning of these shadows, and a decision as to whether they are caused by pathological conditions, requires on the part of the radiographic diagnostician a full knowledge of the clinical expressions of the various affections and of the varying shadows cast in consequence thereof. The experienced operator interpreting the radiograph is enabled to determine by further examination, percussion or other symptoms, whether a necrotic condition is present, that may be not only incurable, but a distinct menace. It is not to be assumed that all rarefied areas are pernicious, nor that their discovery condemns the tooth, but it is decidedly incumbent upon the dental diagnostician to point out the probability of a focus of infection being present.

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*Read before the District of Columbia Dental Society, June 15, 1917.

The practice of rendering an opinion based upon the interpretation of the radiograph without further clinical evidence is to be discouraged. This brings a point for discussion. To whom does the film that you have taken, or have ordered to be taken, belong?

When my confrere sends his patient to me to have certain indicated areas radiographed, my labors are completed after I have obtained a proper focus and a well finished picture, unless my confrere requests that I go further and note my interpretation. It is distinctly without my province to venture opinions or suggest lines of treatment to patients not mine, without having been invited so to do by the dentist who referred that patient. Here is a case where I have acted in the capacity of radiographer, and am to deliver the radiographs to my confrere.

In making a diagnosis for my own patients, I resort to the aid of the radiograph whenever I consider it necessary, and the radiograph that I make is for my information and aid in determining certain suspected pathological conditions, and after the radiograph has served that purpose, it becomes a matter of record, that in my opinion most rightly belongs to me. The fee charged is for the diagnosis, and is not the cost of the radiograph, and I hold that the patient has no more claim upon the radiograph than the lawyer's client can lay claim to the law books, notes, authorities, etc., that the lawyer employs in summing up his opinion.

You are all aware that there are patients who, having been apprised of the diagnosis made in these cases, immediately set about to consult other practitioners. There can be no objection to further consultation, but upon the face of it, it seems most apparent that they are dissatisfied with the diagnosis and seek to find some one who will hold to a different opinion, and in order to facilitate matters, expect to be furnished with data that you or I have labored to procure and place it at the disposal of another. It often happens that there is a difference of opinion between men who are competent to interpret radiographs, just as there often is a difference of opinion between professional men in diagnosing other maladies. Speaking for myself, I invite consultation in cases where there is doubt, and I have explained to patients who demanded the radiographs that they will be filed in my office and that I will be pleased to exhibit them and to discuss their interpretation with anyone whom they select as consultant. I do not believe that it is incumbent upon us to provide the patient with radiographs to carry about from dentist to dentist. If our ability were reckoned to be good enough to make the diagnosis in the first instance, we certainly are entitled to the courtesy of being present to uphold or defend our views if a conference is to be held to contradict them. There are a lot of mischievous people in the world. Who has not had a patient unexpectedly burst into the office to confide that he has long employed the services of a certain dentist, but, of course, he hastens to explain, wouldn't mention this dentist's name for the world, because he respects him so much, but that this dentist has suggested some procedure and that he would just like to have our opinion and advice, and simultaneously he gleefully exhibits a radiograph? How should this situation be handled? Here is a person surreptitiously seeking to undermine *you*, an ethical, conscientious, able practitioner, by soliciting advice, clandestinely, from a fellow practitioner, who may be perhaps your closest friend, to join with him in making trouble for you. Gentlemen, I believe that it is a dangerous thing to allow patients to have radiographs in their possession.

I do not regard the interpretation of radiographs to be as simple as I infer that some men do. The radiograph is but a guide, and the mysterious shadows that puzzle may be solved only with the patient present for clinical observation. For that reason, I believe that the frequent practice of dentists exhibiting radiographs to fellow practitioners, for the purpose of gaining their opinion or interpretation in the absence of the patient, should be discouraged.

Several very splendid papers have been read before our society upon the subject of root-canal filling. This work has made great strides during the past year. But it remains to be seen whether the dental profession can cope with it. There is no need to deny that the dentist is responsible in the past for many sins of omission and commission. Where we are going to end, is a problem! Poor root-canal work can be laid at the door of every dentist, both living and dead. Not a man would have the temerity to dispute that statement! And furthermore, every man practicing dentistry today, or who will be practicing dentistry one hundred years from today, will be doing poor root-canal work! The technic has improved, and will continue to improve, with the result that far better work in a large number of cases will be done in the future than has been done in the past, but as long as lives of teeth are sacrificed, just so long will there continue to be poor root-canal fillings, for the very good and sufficient reason that there are a large number of teeth the conditions of which make it a physical impossibility to hermetically seal their apices. But even more sad than the lamentable root-canal situation is the seeming indifference of the profession to its use of the only weapon placed in its hands with which it may successfully combat conditions that make necessary the devitalization of teeth.

How many will say that the welfare of our practice is being safe-guarded by sufficient prophylaxis? Does anyone doubt that conditions arising from the ravages of pyorrhea, or from one or more abscessed teeth, or from artistically-crowned restorations supported by roots but partly filled, might not have been averted if the patient had the benefit of frequent and thorough prophylaxis? Prophylaxis has long since passed through its experimental stages. It is today accepted as the only means offered for the salvation of sound teeth and maintenance of healthy surrounding tissues. It would be a wonderful stride in the right direction if we could institute a program of vigorous pursuance of this measure in our practices, and start the program at once.

War Dentistry is a new nomenclature that has sprung up within the year. It is important! In the great world conflict, the invaluable work done by the dental profession has made it possible to reform and rehabilitate men, hundreds of whom have been mutilated to make their appearance so unsightly that they would be repulsive or objectionable to society. These men might be greatly handicapped in life's work after being discharged from the army but for the "war dentist's" services.

To the "war dentist" belongs the credit and praise of performing oral and plastic surgery so skillfully that faces that were hideously disfigured present a scarred but normal appearance. Nothing has happened in our annals that has brought the profession into such universal prominence as "war dentistry." The value of "war dentistry" was quickly realized by the French government, which deemed it necessary to recall more than 1,100 dentists from the line to commission them for active duty in the dental corps.

The status of the army and navy dental surgeon in the United States has been raised to a high plane during the past year. In the army one year ago, the dental surgeon ranked as lieutenant only; that is to say, there was no advance in store for the army dental surgeon. Today he starts in as first lieutenant and can, by conscientious work and service, attain the grade of captain and finally be advanced to the grade of major.

In the navy a year ago the naval dentist ranked as lieutenant, junior grade. Today, by conscientious work and length of service he can attain the grade of lieutenant, and finally be advanced to lieutenant commander.

In both the army and the navy one dentist is allowed for each quota of 1,000 men, but it is to be hoped that the coming year will witness the enactment of a law that will provide a dentist for 500 men in both branches of the service.

In addition, a large number of men have joined the Preparedness League of American Dentists, which stands ready to furnish the government the services of thousands of the best men in our country, willing to do their bit whenever they are called.

The past year witnessed the dying struggle of emetin, the heralded cure for pyorrhea. It is to be hoped that in the future each and every new discovery will be thoroughly investigated before its merits are proclaimed and accepted by the profession, as was *not* done in the case of emetin. It does not seem to me that the dental profession can ever cease apologizing for its blunder in condoning its use. Our blunder is equalled only by the medical profession's blunder in sponsoring Friedman's turtle serum as a specific for tuberculosis.

There has been nothing new in the treatment of pyorrhea during the past year. We are having the same pyorrhea this year that we had last year, and that we shall have next year. The man who seeks to alleviate this condition by depending upon the therapeutic value of drugs is lost. The pyorrheal cases that are amenable to treatment are amenable only to the treatment that entails an intelligent, thorough, surgical interference, and it is my opinion that this method will never be supplanted by another.

Sometimes I am asked to give the causes of pyorrhea. If I might indulge myself I should feel constrained to say that pyorrhea is caused first by neglect; second by malocclusion, and third by dentists. A great many persons boast that they have not been to a dentist for many years, and suddenly awaken to the sad realization that they have a well-developed case of pyorrhea. The cause of pyorrhea here is due to neglect. Another class, discovering that it, too, is at the mercy of this insidious condition, exclaims, "I have had my teeth cleaned twice a year by a dentist and simultaneously have developed a case of pyorrhea." Responsibility for that pyorrhea may most righteously be laid at the dentist's door. No dentist can excuse himself for not discovering pyorrhea if the patient presents himself once in six months. Busy dentists try to excuse their lack of watchfulness in not giving their patients proper prophylaxis, because they are too engrossed performing other duties.

The past year has seen a fruitful trial of an experiment that will prove a great boon to the profession and patients as well, when it is a little more carefully worked out. I am referring to the advent in the field of the oral hygienist, a woman who has had training in certain branches that qualifies her to act in the capacity of nurse in the dental office. Among her duties she does what may be termed simple prophylaxis. By that is meant the removal of deposits, accretions and stains on the teeth, and the subsequent polishing of the teeth; provided, however, that she shall confine her efforts to surfaces not underlying the gum tissues. She knows how to sterilize instruments scientifically, to assist in dental operations, keep dental records and numerous other duties. Some states have enacted legislation permitting an oral hygienist to practice. She is required to pass a satisfactory examination, conducted by the Board of Dental Examiners, who place restrictions upon the services that she may perform. The hope has been entertained that the District of Columbia will very soon recognize the necessity for the enactment of such a law and that our society will proceed to bring such influence to bear that the district commissioners will recommend that Congress enact the law.

In closing it is gratifying to note the interest that has been manifested in our society during the past year, and to note its ever increasing growth. Its officers are to be congratulated for their splendid services and to the several committees is due the hearty thanks of the society for the assistance they have rendered.

1624 I St. Northwest.

A good deal of the trouble of this world arises from the fact that some folks like to have gardens, while others prefer to keep hens.

—*Nixon Waterman.*

THE CONSIDERATION OF PRINCIPLES INVOLVED IN BRIDGE CONSTRUCTION*

BY KARL G. KNOCHE, D.D.S., CHICAGO, ILL.

THE SUBJECT under consideration next to root-canal work is of very vital importance to our profession. As crown and bridge workers we have had directed toward us some of the heaviest guns of those interested in pyorrhea and focal infections. Since the time of Hunter and before, it seems to have been and is the common thing to find the journals ladened with condemnation of crown and bridge work in general. The results obtained by the application of the systems in vogue in the immediate past have warranted even more condemnation than they have received.

However, so much in dentistry has been assailed that the profession as I find it is somewhat at sea. We must settle many questions now rather open and arrive at a basis of thought and reasoning that takes in all phases of the big human organism question. We have had destructive criticism long enough, and something should be done along a constructive campaign. As far as I can see in most of our work, reformation is necessary, but I cannot see how anything but a revolution in crown and bridge work will be of any benefit. The old systems of work must go if we are to come out of our present position into one that is our just due.

In order to reach the position we should occupy in the dental and medical professions, we must first have a definite standard. Nothing minus a standard can be scientific. This standard must be the result of research, of careful consideration of the human anatomy and physiology, and must be borne out by clinical observation. The only thing in dentistry that is truly scientific is cavity preparation, since, through Dr. Black's efforts, we have a standard "Extension for Prevention"—and see what his work has accomplished! To go into the question of the failures in crown and bridge and their relation to focal infection would be a loss of time, since this has been covered often.

The evidence piled up by every-day observation is sufficient to convince anyone of the great part our crown and bridge work plays in the problems confronting us today. I would like to quote from a former paper in regard to the shell crown. I believe the shell crown must go, and will digress a moment for that reason.

"The greatest harm done by fixed bridge work has, however, resulted not because they were fixed but from faulty foundations upon which they were built. We must depend upon our foundations for the success of any superstructure, and the most popular foundation for our fixed bridge work has been the banded crown, or shell crown, that has been fitted to the abutment tooth. Allow me the privilege of withdrawing the word 'fitted,' since I have seen precious few that fit. My condemnation of the practice of banding teeth will be as severe as the results usually obtained by their application warrants, and that is extreme. More misery, more pyorrhea, ill health and even death from systemic conditions have been produced by the irritation of bands than any other one thing in dentistry, excepting the improper filling of root canals. These seem harsh and broad statements, but are borne out by clinical evidence and cannot be refuted. It is absolutely impossible to fit a cylinder of metal, no matter how thin, over a conical-shaped root and obliterate the margin of the cylinder. No operator, with any knowledge of cavity preparation, would think of finishing a filling to any but a margin cavity, and yet this fact is forgotten when preparing a tooth or a root for a band. Even though a band be wonderfully adapted, one little concavity unnoticed by the operator in the root surface, at the margin of the band, allows this band at this point to stand off, and here irritation begins its process of pyorrhea. However, I know that a few men place many, and more men place a few, bands that hug the tooth so closely at the gingival as to produce little irritation and in some very resistant mouths, none at all. These crowns give valuable service. However, the rank and file, and they are in the vast majority, do not even approximate a fit to the root, and how many crowns of this kind are in mouths today, very slowly but steadily and surely destroying the teeth to which they are cemented? They may protect the crown of the tooth and make sturdy abutments for bridges for a time, but they are a very decided, constant and destructive irritant to the soft tissue, and nature through pyorrhea, in trying to get rid of the irritant, casts off the tooth with it as surely as it would slough out a sliver in the hand. If this were all we might still tolerate it, but it is not. How many of our physical troubles may be traced to some focus of infection arising from the irritation of this band, we do not yet know, but we have had enough indication of them to make us fear their numbers. Therefore, a system of practice in which so great a chance for tooth destruction and injury to bodily health prevails is wrong and we must seek something better."

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*Read before the Northern Ohio Dental Society.

The subject of pyorrhea is of vast interest to us from the fact that so much of it is caused by the dentist himself. So many of our dental operations produce an abnormal condition in or about some unit of the dental arches that results in a condition that I include in malocclusion. My position on this question can best be given by quoting again from a former paper:

"I believe that malocclusion, with its resultant undue pressure in an abnormal direction on the peridental membrane, plays the most important part in the development of pyorrhea conditions. How often has the loss of a single tooth, the failure to properly separate teeth, resulting in the loss of normal contact, and many other things, brought about a malocclusion that resulted in an acute case of pyorrhea, which never could be treated successfully without the restoration of the occlusion.

"A few words will suffice to give you my thoughts on malocclusion and its relation to pyorrhea. Malocclusion to me means any break in the continuity of the dental arches, for just so soon as we have a break we have an abnormal condition and a malocclusion. This break may be a cavity allowing the tooth adjacent to it to move forward, and we then lose normal contact, with the resultant pinching out of the interproximal tissues, and the loss of what Dr. G. V. Black so clearly calls the alveolar crest. Unless the teeth are properly separated and a filling then inserted to restore the normal contour of the tooth involved, we simply perpetuate the abnormal condition and we have ultimately a loss of interproximal tissue, and so on. This break may be the loss of a single tooth, allowing the teeth to tip and so producing stress in an abnormal direction on the peridental membrane, and then the inevitable follows.

"This abnormality may be an interference with the normal exercise necessary to maintain the health of the teeth. We find teeth under too great stress or too little. In the first place an inflammation is set up by the irritation and in tne second we have a lowered vitality and lack of resistance due to improper stimulation. This break in the normality of the dental arches may be in the nature of uneven wear of teeth, which must mean uneven stresses. This malocclusion may so often be the result of apparently well-made fillings and inlays. The presence of fillings of any sort which are not perfect reproductions of the occlusal surfaces are sure to produce malocclusion, simply because the flat-surfaced inlay provides a fine surface for the patient to slide around with no place to lock and maintain the balance. One of the greatest faults found with fillings of all kinds is the usual total lack of the marginal ridges. They are usually provided with planes inclining toward the contact point, affording every opportunity for food to pack against the gum septum.

"My one great objection to amalgam is the fact that for some time I have believed that many men shorten the bite somewhat every time they insert an amalgam filling by excessive trimming to protect the still plastic material. The nature of the material influences the operator to trim until perfect occlusion is lost.

"As to the results obtained by a restoration of the normal occlusion in post-pyorrhea treatment, let me say that they are often startling. I have known many cases in which the instrumentation was simply palliative and of temporary benefit until the malocclusion was corrected and the teeth stimulated or rested, as the case might be. So this subject becomes one of vast import and I am convinced that we as general practitioners, pyorrhea and prophylaxis workers, or bridge workers, need a clear knowledge of dental anatomy and especially that portion that deals with occlusion and its abnormalities even to a greater degree than does the orthodontist, if we are to serve the public in an intelligent and beneficial way.

"This sums up my position on occlusion. I have gone into it so deeply because in most cases nothing so satisfactorily controls this problem as does a removable bridge."

Now, if you please, let us concern ourselves with a study of what may be termed the principles to be considered. What should be the foremost principle to receive attention? To my mind this is the badly neglected study of physiology. What is the physiology of the teeth? With this really understood and the dentist honest, fewer mistakes will be made.

We can have no pathology unless we have a disbalance of our physiology. If we understand the physiology of the teeth, we understand their anatomy. Why is one tooth different from another in shape, contour, size, etc.? Because it was designed to function (physiology) differently than the other tooth. So you see reason in the anatomy of the teeth through knowing their physiological functions.

Now that I have enunciated the principle upon which all other principles involved shall rest, let us look at some of those that it becomes necessary to consider.

We should study the question of our restoration from the standpoint that the full number of teeth constitute the masticatory organ and that the separate teeth are but units of this organ. This, then, emphasizes the fact that an operation, no matter how simple, upon any unit has a marked influence upon the entire organ. To go further, this unit through its influence upon the organ as a whole has an important bearing upon the entire human organism of which it is an intimate part.

To go into the subject a little closer, let us emphasize and study the physiological functions of this organ. Teeth have functions and a careful study of these functions will help us understand the part they play in this very interesting human organism.

The best description ever given this subject is that given by Dr. Herman Chayes, and I will take the liberty to quote from his article in the December (1915) *Items:*

"*Reciprocal Functions of the Teeth:* The thing that suggests itself first to my mind in regard to tooth function, is the reciprocal functions of the teeth, reciprocal because they do something for the organism which does something for them.

"Since every organ of the body passively and actively exercises such functions, these may be called the 'reciprocal functions,' and must be classified as the 'passive' and 'active reciprocal functions' of the special organs.

PASSIVE RECIPROCAL FUNCTIONS

"The passive reciprocal functions of the teeth are defensive, cosmetic, developmental and phonetic.

"*Defensive:* The defensive depend upon the gross anatomy of the teeth; that is, they are so shaped as to prevent injury to the soft tissues surrounding and supporting them.

"*Cosmetic:* The cosmetic depend upon the gross anatomy, geometric harmony and the bio-chemistry of the teeth. They must be in harmony with other features of the face and by correct growth, influence the other features of the face to harmony, thus also partly exercising the developmental function.

"*Phonetic:* The phonetic depends upon the gross and microscopic anatomy of the teeth and their position relative to each other. That is, they must not only be of a shape and relation conducive to clear enunciation, but also of a texture insuring the proper degree of resonance or vibration. The latter part of this function we can unfortunately not restore by artificial means.

ACTIVE RECIPROCAL FUNCTIONS

"The active reciprocal functions of the teeth must be further classified into general and special.

"*General Reciprocal Functions:* The general are cardio or vaso-auxiliary and symptomatic.

The cardio or vaso-auxiliary function consists in the restimulating effect which the mobility of the teeth has upon the circulation of the structures in which they are, and with which they are resiliently joined.

"By virtue of this mobility, they induce a rhythmic intermittent pressure which, inimical to end tissue stasis, brings about a constant change of the nutrient elements traversing the nutrient channels of these tissues.

"The *Symptomatic* must be subdivided into structural and positional.

"The structural symptomatic may be indicative of some congenital or acquired constitutional anomaly such as (Hutchinson's teeth) thyroideal disbalance (as illustrated in teeth easily attacked by caries), or in the presence of a marked procreative urge, often bordering on lack of sexual equilibrium, as illustrated in cuspids of decided prominence and marked prehensile formation, reflecting perhaps the animalistic trend of the individual in whom very frequently are also to be found small suprarenal bodies with narrow cortex, demonstrating perhaps a greater procreative and a lesser intellectual mission in the cosmic scheme.

"The positional symptomatic deal with the mal-position of different teeth in the maxillæ and mandible and are valuable diagnostic determinators in that they thus unerringly point to pituitary, gonidial, thyroideal and adrenal disturbances which would otherwise be most obscure.

"*Special Reciprocal Functions.* The special active reciprocal functions of the teeth are communal and individual.

"The communal special reciprocal functions of the teeth are alimentary and inhibitory.

"The alimentary consist in the part they all play in the preparation of certain foods for the process of digestion.

"The inhibitory consist in the physical relationship of the teeth or their relative apposition mesio-distally in particular, so as to retard, or limit, the latero-rotary motion they acquire when in use.

"The individual are those of incision, prehension, mastication and trituration, and in the sequence enumerated, involve the incisors, cuspids, bicuspids and molars.

"And since all functions are reciprocal, there can be no fixed rule or line of demarcation as to where one stops and the other begins.

"All these enumerated, classified and dissected, present themselves vividly at some point, the height of the particular functional expression, to gracefully and gradually merge or lose themselves in those which follow.

"Thus we have an interplay of parts devoid of harsh or interruptive demarcations. A pleasing harmony as expressed in co-ordinate effort, salubrious in effect; a song of work as marvelously planned as it is symphonically expressed in livingness, and yet more livingness to the glory of the mind that bade it come into being."

The functions we are most vitally interested in are those of Prehension, Incision, Mastication and Trituration.

These bring us into the question of stress and its directions and give us the greatest guide in the production of a reproduction that will function normally and allow the abutment teeth to function normally. Teeth move in function and move in varying directions as their functioning stress is brought to bear upon them. Thus it is seen that the direction of the stress brought to bear upon a central is not the same as that brought to bear upon a cuspid, bicuspid or molar, and that the direction of stress brought to bear upon a cuspid is not the same as that brought to bear upon a bicuspid, molar or central.

This, then, leads us to the axiom that to fix by means of bridge a cuspid, central and molar, is wrong, since under these conditions it would be impossible to bring any unit of the bridge into function without applying to the other units directional stresses that would be abnormal to them. This is not all. These teeth moving in abnormal directions during function would also be brought into function at once, or *en masse*. That is, if the stress of incision were applied, the balance of the bridge would, on account of its construction, be functioning at a time when it should be at rest. The same is true when the molars would be brought into function the central and cuspid which had finished their work would, nevertheless, be subjected to stresses and movements abnormal to them.

The disarrangement of the physiological balance does not stop here, but continues to the lower teeth. Since the forces applied are produced by moving the lower teeth in occlusal stress against the upper teeth, it will be seen that any abnormal stress or its direction applied to the upper teeth transmits this abnormality to the lower teeth.

This question brings us to an important consideration, namely, that tissues require stimulation. Most tissue obtains its stimulation through exercise, as do the teeth. The active exercise of the teeth through proper mastication of food properly stimulates the tissues. Tissue must also be free to obtain the necessary exercise for stimulation. Anything that hinders in the least this freedom of obtaining stimulation is physiologically wrong and produces a disarrangement followed by the natural atrophic changes.

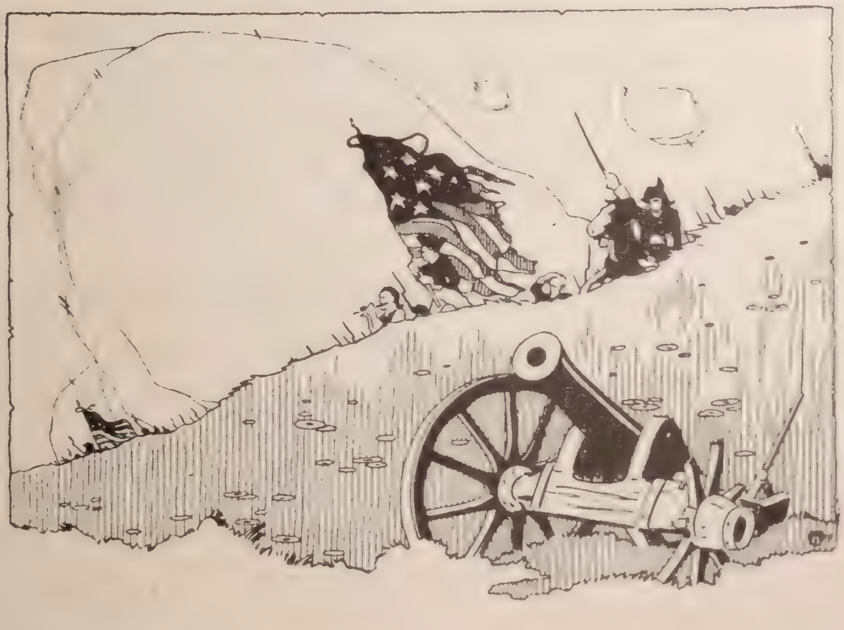
Thus, the application of a bridge as before mentioned, interferes to the worst degree with the freedom of obtaining exercise necessary for stimulation. Hence it becomes of the utmost importance to make application of attachments in bridge work that will meet the requirements. These must permit movement of both the bridge and bridge pier, and this movement must be the movement normal to the teeth replaced or the tooth involved as a bridge pier.

Another principle to be enunciated here is that the movement of the tooth is not an unrestrained one. That is, there are natural physiological limits of movement under stress, so that attachments that permit of unrestrained movements, or of movements in every direction, are wrong for that reason.

The system of bridge work as so ably brought out by Dr. Chayes is perfect, and stands today as the only system that has back of it any reason for existence.

The foregoing relates to those cases which might be classed as normal or nearly normal, with no or little loss of normal function. We might say that these cases represent those in which we have had little gingival involvement, such as in the pyorrhea case. In my mind there are a few cases, those in which pyorrhea has run its course, few teeth left and those having lost most of their normal function and become to a greater or less degree weakened in their sockets.

It is in these few cases that I prefer a type of bridge that is removable and still acts when in place as a rigid splint to the few remaining teeth. In this case I do not desire the breaking of stress as I do in the cases outlined before.



"THE SPIRIT OF 76"

DURING the war—

Take your coat *off* but—

Keep your shirt *on*.

TREATING PULPLESS TEETH—THE NECESSITY OF THE X-RAY*

BY G. P. ROBERTSON. D.D.S., SAN ANTONIO, TEXAS

THE SCIENCE AND ART of dentistry have long passed the state of development when its ministrations consisted entirely of mechanical restorations.

We are intensely interested in the responsibility which confronts us as an important factor in the prevention of the many diseases to which humanity falls heir. We are not confronted by any more perplexing conditions today than formerly, but the large majority of the profession is awakening to the fact that they can cope successfully with the treatment of pulpless teeth. There seems to be a general awakening to the importance of focal infection and the proven results. It is a known fact that the larger insurance companies are so interested in focal infection and care of the teeth that they are going to great expense for the care of their employes' teeth and later checking the records, and it will without doubt soon be one of the requirements of applicants for insurance to have the mouth in a healthy condition, and an X-ray made of the same to prove there are no areas from which there are infections endangering the longevity of the applicant. If there are indications of trouble we are sure to be besieged with orders from his physician saying, "extract." Now, it is up to us to be able to do it successfully. The patient will be instructed to go to some one who can.

One of the greatest requirements for successful root-canal work is time. I find most patients are willing to spend the time and money it requires to properly prepare the roots of the teeth which they value many times more than we realize. I do not recall a single patient who has not shown appreciation of my efforts along the line of root-canal work, when he has been impressed with the importance of sealing each root end. An extra hour or two spent opening a tortuous canal may mean health and comfort to the patient, while neglect and hurrying through will mean suffering and the shortening of the usefulness of the tooth treated, and perhaps be the means of causing an infection that instead of being easily eliminated, may take months and even years to eradicate.

There are so many angles from which to view this subject of treating pulpless teeth that we will start with the live or normal pulp. I would say the first step after blocking would be to thoroughly polish and cleanse all the external surfaces of the tooth involved and also the adjoining teeth, after which the dam should be adjusted. It seems a needless repetition to say the rubber dam must be in place before the tooth is opened. I say needless repetition, and yet one can step into many dental offices any day and find men opening into vital teeth without the first precaution for asepsis. Napkins, cotton rolls, or what not, will not maintain a clean field for the operation, regardless of the greatest painstaking care the most careful operator can follow.

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*Read before the Texas State Dental Society, 1917.

By the use of novocain it is possible to open into the most sensitive tooth within a very short period with everything previously arranged as regards asepsis, and the necessary instruments to complete the operation in place.

I do not find it always possible to extirpate the pulp by simply blocking or infiltrating with novocain. The facts are, I do not believe it possible to do as effective work after blocking as can be done with pressure anesthesia, as there is no diagnostic response at the apex such as is found with pressure anesthesia; however, I do not always find it possible to gain access to the pulp without blocking.

When the dam is in position, apply tincture of iodin to the teeth exposed and after five or ten minutes wash with alcohol to remove stain. The dam and teeth are now in as nearly a sterile condition as it is possible to get them under existing conditions. After there is sufficient anesthesia to open into the pulp, puncture the same with a small bur which has been previously sterilized, after which flood the cavity with formocresol. This antiseptic precaution should be taken at this time as it is very difficult to maintain strict asepsis in a dental operation of this character. After leaving this a few moments, absorb the formocresol with small prepared absorbent pellets. A few crystals of novocain or one pellet of Parke-Davis No. 151 cocain and adrenalin is placed on the punctured pulp. A very slight pressure with a small piece of unvulcanized rubber will complete the anesthetization of the pulp. I proceed with my larger burs and lay the chamber open until I acquire free access to every opening of the canals. Many times it is necessary to seemingly sacrifice good tooth substance, but I can assure you it is no sacrifice, for you must have a clear vision of the canals. Any tooth which must have the pulp removed must necessarily have the margin of the cavity extended for successful filling, and why not extend them during the treatment and not be trying to work in the dark, back of walls which are later removed? After one has the desired access the pulp cavity must be again flooded with formocresol. Now, with a very small, smooth pathfinder broach, go to the apex of each root and there and then determine the condition of the roots before the introduction of broaches or files. I usually remove the pulp from the lingual branch of a molar with a fine barbed broach; however, I do not go into the buccal canal with even the finest barbed broach, but prefer the fine tapering files, gradually working up to the larger ones. If I find it difficult to reach the apex with the fine files (which I often do), I use thirty per cent. sulphuric acid, applying it with tantalum carriers, applying the bicarbonate often, which aids in removing the debris. After reaching the apex, flood the canals with alcohol and dry them with electric canal driers, prepared cotton canal points or by the use of cotton wound upon smooth broaches. I find in small canals that a small wisp of cotton wound upon smooth pathfinder broach will follow the canal to the apex with the least difficulty.

These can be prepared by holding a very small wisp of cotton and the end of a smooth broach between the thumb and index finger of the left hand, and rotating the broach with the right hand. This will give you a very efficient drier and carrier for any medication to the apex of the very finest canal. However, it is imperative that these shall be prepared and made sterile before the operation. It is a very easy matter for an assistant to prepare and sterilize fifty to one hundred of these and have them always ready for use. I have tried many, many cases in immediate closing of the apex of the tooth; however, I am of the opinion it is better practice to seal the tooth, leaving a cone of dry absorbent cotton in each canal at least twenty-four hours. At the subsequent sitting the absorbent point may be removed and it will be found invariably either moist with a white fluid or stained with a small particle of blood, and I am thoroughly convinced I have saved future trouble. It is possible now to measure the length of the root with the apexographer, and the size of the apex with cotton wound upon a broach, cutting a gutta-percha point the size of the cotton and sealing the apex with the first cone. Moisten the canal with eucalyptol compound. Continue packing small points to place and if you have been filling canals with one or two cones, you will be amazed how many more small points you can pack in one canal.

If you are filling a canal in which you expect to open later for a post or tube, pack the canal two-thirds full from the apex and then place a dummy of cotton, after which pack with a good quality gutta percha. This obviates a record, for it makes no difference when the patient returns, if you find the dummy of cotton and the canal filled beyond, you know you have previously sealed the apex without needless reference to your record.

By following the proper technic there is no necessity for so many failures subsequent to the removal of pulp and filling canals of a normal tooth. Now the same procedure as to a clean field applies to a putrescent case. Unless the case presents an inflamed condition, it is best to merely open into the pulp cavity, sealing formocresol in the same for forty-eight hours. This may not destroy or sterilize the gangrenous conditions, but it certainly does affect the contents so that you can open into the canals with the assurance that you will not have the acute symptoms which invariably appear upon entering the canals without this precaution.

In an acute case with pus forming, it is best to apply the dam and flood the pulp cavity with formocresol, then work through the apex of the offending member and establish free drainage.

In cases where there is an external opening, enlarge and cleanse the canals by the use of sulphuric acid, neutralizing often with bicarbonate of soda. This is a great aid in carrying the contents of the canals into the pulp chamber and many times prevents working them through the apex. As soon as the canals have been thoroughly opened they should be dried with alcohol and hot air, and then phenol sulphonic acid forced through the external opening, seal and dismiss the patient for from four to ten days. Upon the return of patient I find in the vast majority of cases the tissue surrounding the tooth having assumed practically a normal condition and the canals ready to be sealed. If the case has not progressed as desired, repeat the phenol sulphonic acid and dismiss the case for ten days and give nature a chance to do what no known preparation does so well alone. If, after the second application, the results are not as anticipated, it is best to follow the usual surgical procedure.

I find the X-ray an invaluable adjunct both before and after the opening of the case. For instance, if a case presents which has been previously treated and has not been satisfactorily done, you have a picture made and find the fatal little window or broken drill or broach which the former operator made. Sometimes it is embarrassing after having drilled in a tooth for ten or fifteen minutes and then have to explain to the patient that it is the result of work done during a previous operation. How much easier to convince or explain the condition from a film before you have rendered any other service. I happen to know a man in our profession, one of our very best, who within the past few months was notified of having a damage suit filed shortly after having opened a central incisor tooth, the root ot which had been previously perforated. The X-ray is the safest means we have for diagnosis and yet I have not always been able to convince my patients of the value of being sure; however, I always deem it advisable to suggest it.

In conclusion let me say I have not tried to present to you an unreasonable procedure in treating pulpless teeth, but one that has been proven and if followed will eradicate many failures.

Has the Army Dentists Made Good?

The following list is the work of one dental officer (and his staff-sergeant and orderly) attached to a field ambulance for one year, and during the year worked in twenty-two different places. If the reader is in doubt about the answer to the question at the head of this paragraph, let him work out the value of the work done and balance it with a lieutenant's salary:

28th January, 1917.

Extractions	4208	Part lower denture	260
Am. fillings	1745	Full upper denture	65
Cement fillings	195	Full lower denture	8
Root fillings	159	Repairs	504
Crowns	34	No. of patients	6482
Part upper denture	306		

—*Australian Journal of Dentistry.*

FOCAL INFECTION*

BY GAVIN HAMILTON, M.D., C.M., F.A.C.S., HOUSTON, TEXAS

THE KNOWLEDGE that a systemic or general disease can be produced by a local infection is as old as the science of medicine itself. Long before bacteriology was developed it was recognized that wounds, whether accidental or surgical, developed pus, and many times produced disease characterized by chills, sweats, fever and general debility, attended by a high mortality.

Putrefaction caused by some contaminating agent was thought to be the cause of the disease. Pus was normal and laudable. Putrefaction caused the changes in the pus and was responsible for the general or systemic disease. The word "septic" is a reminder of this period. Many theories were brought forth to explain putrefaction, but until the connection between the dissecting room and the lying-in-hospital was observed as a cause of puerperal sepsis, the true nature of infection remained securely hidden. From this epoch onward through the works of Klebs, Pasteur and Lister, the world was given antisepsis and asepsis.

In recent years the principle of focal infection has been broadened and we are now accepting it as a working basis for the explanation of the etiology of many local and general diseases beyond those produced by the pus-producing organisms.

A focus of infection is an area of tissue infected with pathogenic micro-organisms. Foci of infection are primary and secondary. The primary foci are usually found on the outer or inner surface of the body. Secondary foci result from the transferring of infection to some other part of the body by the blood or lymph streams, or by direct extension through contiguous tissue.

While a primary focus of infection may be anywhere in the body, the vast majority occur in the head and urogenital tract. Pyorrhea dentalis and alveolar abscesses, faucial and naso-pharyngeal tonsils, the mastoid and para-nasal sinuses are the common locations in the head; the urethra, prostate and testes in the male, and uterus and fallopian tubes in the female, are the common sites in the urogenital tract. The respiratory and alimentary tracts are frequently the site of a primary focus. But it must be remembered that a primary focus may be anywhere and all that is necessary is to have pathogenic micro-organisms establish a base in the tissues.

When the micro-organisms are not disseminated by direct extension through contiguous tissues, they are carried by the lymph or blood stream. When carried by the lymph stream they are taken up by the lymph nodes and a secondary focus develops. This secondary focus in the lymph nodes persists after the primary focus is gone, and is often an indication of the location of the original infection. This persistent secondary infection may again be the source of further dissemination throughout the body.

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*Read before the Texas State Dental Society, 1917.

The hematogenous route is the commonest. It has been necessary to reconstruct our ideas concerning septicemia and bacteremia. We now know that there are many cases where the blood stream is carrying pathogenic micro-organisms which are not suspected. We frequently see men who are occupying responsible positions and carrying very great business and professional loads, who are reeking with the spirochæte or some other organism. These cases go on until a secondary focus develops, and then we recognize it as a disease. We have for some time recognized that such diseases as acute articular rheumatism and endocarditis must be produced by the blood carrying the causative agent, but there are many other diseases which in all probability occur in this manner. Chorea and erythema-nodosum have a remarkable relationship to tonsilitis, rheumatism and endocarditis. More recently we have had evidence produced leading us to believe that many other organs receive the infection by a rear attack, or through the blood stream. Cholecystitis, appendicitis, duodenal and gastric ulcer and nephritis have been produced by the injection of bacteria into the blood current. Also in a large per cent. of these diseases a blood culture will yield the organism which is causing the disease. Blood culture in pneumonia and typhoid fever are the means of making the earliest possible diagnosis.

From the lesions of pyorrhea, alveolar abscesses and infected pulps of the teeth can be obtained streptococcus viridans, streptococcus hemalyticus, staphylococcus aureus and albus, and fusiform bacilli, as well as others of less pathogenic properties.

The endamœba probably plays its role by acting on traumatized gum tissues and preparing the ground for the growth of the pathogenic bacteria. At all events, the bacteria are the important organisms from the standpoint of focal infection.

The usual lesions in the mouth where these organisms are found are:

(*a*) Alveolar abscesses. These infections are not always easily diagnosed. X-ray photographs are necessary in all cases; in many cases a photograph will disclose the presence of an abscess which has not been suspected. About eighty per cent. of dead teeth develop alveolar abscesses. Streptococci are almost universally present in these lesions. These abscesses may occur by infection through the root canal or be hematogenous in origin. The lack of filling or improperly-filled root canals are often the cause of focal infection. A root canal can be accurately filled only by checking the work with an X-ray photograph.

(*b*) Infection about erupting teeth, especially the lower third molar.

(*c*) Infection about ill-fitting crowns, bridges and fillings. Very recently I saw a case of acute articular rheumatism resulting from a tooth that was decorated with a beautiful gold crown. Pus had burrowed through to the surface from the root of the tooth and a large gum boil was present. This case rapidly improved on draining the abscess cavity.

(*d*) Pyorrhea, whether caused by the amœba buccalis or the result of pathogenic bacteria, from the standpoint of focal infection makes little difference. It is a lesion which harbors many of the microscopic enemies of the human body.

Given these numerous micro-organisms and the very numerous foci of infection, and the frequency of blood infection, it is rather remarkable that secondary foci are not more frequent, and general disease almost universal.

Immunity, both local and general, natural and acquired, is the answer. Immunity is relative. Phagocytosis and the bactericidal and antibody-forming powers of the tissues protect the majority of us from infection. The degree of immunity may be decreased by exposure to cold and wet, starvation, physical and mental exhaustion, alcoholic dissipation, misuse of narcotic drugs and exhaustion from general diseases. The processes of immunity are:

First: Positive chemotaxis with resulting leucocytosis and accumulation of leucocytes in and around the area of infection.

Second: Phagocytosis.

Third: Formation of protective antibodies in the blood and tissues.

There are two other principles which, when confirmed, will elucidate to an extent the etiologic relation of focal infection to systemic diseases. These are:

First: The transmutability of bacteria (under cultural variation), in form, cultural characteristics, biological reaction and pathogenicity. It has apparently been shown that the streptococcus viridans according to circumstances surrounding its growth can be changed into streptococcus hemolytis, streptococcus rheumaticus, streptococcus mucosus and the pneumococcus. Also this transmutation can be reversed. This being so, it is probable that other groups of organisms are subject to similar influences. The members in the colon group shade into one another from non-virulence to extreme pathogenicity.

Second: The elective tissue affinity of bacteria. The pathogenic bacteria grown from a diseased organ and injected into animals produce lesions in the same organs of the animals. A streptococcus from a diseased gall bladder produces in the animal injected a cholicystitis. When grown from a tissue surrounding a gastric or duodenal ulcer, it produces similar ulcers in the animals injected. A streptococcus culture if grown on a certain tissue or tissue extract, when injected into animals, will attack the tissues similar to those on which it has been cultured. Grown on kidney or kidney extract, it will produce manifest lesions in the kidneys.

These organisms cultured on buillon for a long time again assume a general virulence.

Treatment: Prevention is more ideal than a cure. Personal and public hygiene are extremely important to our well being. The avoiding of debilitating causes makes it more difficult for the micro-organisms to obtain a foothold.

The removal of foci of infection is the same as removing the cause of the disease. Patients may have multiple foci of infection, but not all of them may be producing general infection or secondary foci. However, the only safe course to pursue is to clean up all foci. The indiscriminate operating on all suspected foci and indiscriminate tooth pulling is to be condemned. Pharyngeal and faucial tonsils that are not diseased are better left in place, as they undoubtedly have a function to perform.

Dead teeth should have the root canals accurately filled. This can be done only by checking the work with X-ray photographs. Badly-fitting crowns and rough fillings should not be allowed to remain. Teeth that are beyond the help of the dentist should be extracted. Pyorrhea demands thorough and exacting treatment. The urogenital tract should be thoroughly investigated and infections eradicated.

The use of sera and vaccines has become too popular and have been accepted at more than their value. Sera for the exotoxic bacilli of diphtheria and tetanus are on a definite and accurate basis. No such satisfactory results have been obtained for the endotoxic bacteria. Vaccines have been exploited to a shameful extent. The stock vaccines have been commercialized without a true scientific backing and have been responsible for the neglect of more rational treatment. If we are to look for results from any vaccines, we must look for it in the autogenous vaccines. The good results which at times are seen from the use of vaccines may not be due entirely to specific properties of the substances injected, but may be due to the proteid contents. Results almost as satisfactory have been produced by injecting proteids which are foreign to the infecting organisms present.

I will not attempt at this time to enter into a discussion of the medicinal treatment of these conditions.

Lincoln usually applied his rule of living to his own life. The following advice, given to a young man acquaintance, is worthy of some thought and application: "Do not worry; eat three square meals a day; say your prayers; be courteous to your creditors; keep your digestion good; steer clear of biliousness; exercise; go slow and go easy. Maybe there are other things that your special case requires to make you happy, but, my friend, these, I reckon, will give you a good lift."

ORAL PROPHYLAXIS*

BY F. H. SKINNER, D.D.S., CHICAGO, ILL.

PROPHYLAXIS is the means of guarding against or preventing disease. Oral prophylaxis means carrying out the highest ideals in dentistry, giving such instructions to children as will help to develop good masticatory organs, keeping well mouths healthy, restoring health to diseased tissues, doing that which seems best in our judgment with those mouths presented to us in a broken-down condition, and then giving the patients such instruction in home care as will enable them to help us keep their mouths in a hygienic condition. Periodical visits to the dentist are very essential. The more we can educate our patients in modern, up-to-date dentistry, and especially along the lines of prevention, the more they will appreciate the work we are doing, and unless the dentist has a clear understanding himself, and is able to make the patient fully appreciate what he is trying to accomplish, oral prophylaxis will be a flat failure.

Every dental office should be a little centralizing school of dental education. When patients are in the operating chair, it is our duty to talk on subjects of dentistry which will be beneficial to them. Some patients become interested from the start, while it is hard to make others comprehend. It requires some tact to make the latter class realize the care necessary to accomplish results, that you are striving hard to better their condition and are not working merely for monetary consideration.

One of the objects of this course is to impress upon the dentists the necessity of educating their patients to appreciate preventive dentistry so that they will realize they are getting value received when charged a legitimate fee. When patients refer their friends to us for this work rather than waiting for pathological conditions to arise, we feel that a new era in dentistry is developing.

IDEAL PROPHYLAXIS

The old idea that a prospective mother should shun a dental office is a fallacy. A physician should refer her to a dentist very early, for there are physiological reasons why her teeth are more prone to decay at this time than when she is in normal condition. If any cavities exist, they should be prepared and filled as painlessly as possible, putting the mouth in such condition as to enable her to masticate food thoroughly. In many cases, inlays can be inserted without much pain; otherwise cements should be used. If incurable abscesses exist, it is better for both mother and child that all such teeth be extracted rather than allow the constant absorption of pus. Also, she should have a prophylaxis treatment every month. If she is unable to come to the office, she ought to be treated at home. In connection with suggestions regarding pre-natal precautions, a pretty good program for the prospective mother is plenty of good, plain, wholesome food, plenty of sunshine and a reasonable amount of exercise.

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*A lecture delivered before the Iowa State Dental Society, 1917.

When the child's teeth begin to erupt, the mother or nurse should be taught to watch for and remove any foreign substance which may lodge thereon. With ordinarily good care, few cavities if any will occur. To guard against cavities between the teeth, proximal surfaces should be polished daily with dental floss or very narrow, flat tape. These surfaces of temporary molars are the most prone to decay. If any cavities should develop, they should be filled while very small, thus causing less pain and not endangering the life of the pulp. In addition to the use of the tape and floss, the tooth brush and cotton rolls should be used after each meal. Deep or improperly-formed fissures should be ground out and polished or covered with cement which possesses highly adhesive properties. I generally use one of the copper cements for this. Ames' black copper is preferable on account of its extremely adhesive property. Explain to the patients that if these temporary teeth or their contact points are lost, the first permanent molar will come in anterially of where they belong, and when the bicuspids and cuspids erupt later on, there will not be room enough for them, and poor alignment, which usually causes malocclusion, with all its bad results, will follow. Thumb-sucking, adenoids and mouth breathing should be watched for and corrected.

At a very young age children should be taught to masticate thoroughly and properly. Noyes says: "If the jaws are used chiefly with an up-and-down motion and from front to back, the arch will be longer and narrower, and if there is no vigorous use of the teeth in mastication, the bones will be under-developed and the respiratory spaces consequently narrowed. Normal respiration during the development period exerts the greatest influence upon the growth of the bones. With the mouth closed, the lips are pressed against the labial surfaces of the incisors, the lower lip covering about one-third of the crowns of the upper incisors. The tongue fills the vault of the palate and pushes against the lingual surfaces of the teeth and bone. The air being partially exhausted by the soft palate lying against the base of the tongue, there is a downward pressure on the floor of the nose. With very vigorous inspiration there is a depression of the hyoid bone and consequent pull of all the muscles extending from it to the mandible and tongue; this increases the pressure on the lingual surfaces of the teeth and the downward pressure of the palate. If breathing is carried on with the mouth open, all of the influences are lacking and the results are shown in typical deformities. The changes of bone growth from birth to adult age are largely dependent upon the influence of mechanical stimuli and for full normal development vigorous normal function is necessary. It is useless to establish normal occlusion of the teeth if normal functional stimuli are not distributed by it, and it is equally useless to clear out obstructions from nasal passages if malocclusion rendered normal function impossible. The direction of growth is downward, forward and outward, increasing the distance from the floor of the nose and the floor of the orbit to the incisal edges of the teeth and increasing the depth and width of the nasal cavities." It takes exercise to develop the muscles of an athlete, also to develop the peridental membrane, which is composed of muscle fibers.

At about five years of age, there should be a perceptible spreading of the anterior teeth. If this does not occur, a regulating appliance, which will stimulate growth of the anterior portion of the mandible, should be put on. Wearing a very simple appliance on the lower temporary teeth for a month or two at this age will frequently save a year or two of regulating at a later period in life. Fissures or pits of newly erupted molars and bicuspids should be ground out and polished, or should be protected with cement before any decalcification has started. This procedure will prevent decay of fissures and pits, and cleanliness will prevent decay of the smooth surfaces. Some of the children in my practice have grown to the ages of twelve and fourteen years with very few, if any, cavities.

Pickerill says if he could prevent decalcification of the enamel of the teeth of children between the ages of six and thirteen in girls, and six and fifteen in boys, he thinks he would eliminate ninety per cent. of decay. Personally, I would say to give them special care up to the age of eighteen or twenty. This does not mean that most cavities occur by the time children come to the age of twelve or fourteen years, but that certain susceptible areas have become etched or decalcified, and that later on these will develop into cavities. By thorough polishing I have prevented cavities from forming in etched areas for a period of ten years, but at the cessation of the regular prophylaxis treatments, from any cause whatsoever, patients have returned, in some instances, with these formerly etched surfaces developed into cavities. Regular prophylaxis treatments should not be omitted when boys and girls are away at boarding school or on extended trips. I believe that cavities then could be prevented. So much for ideal care of the mouth.

METHOD OF PROCEDURE IN ACTUAL PRACTICE

We must take cases as they come to us. If a patient is suffering, we must relieve pain first, then get the teeth clean and the soft tissues healthy. If there are a number of cavities, clean out the decay and fill with cement, then take wax impressions of the teeth, run up models and study the case. Black claims that the average person, at the age of forty, has worn away enough tooth substance from proximal surfaces to represent the width of a central incisor, so that the arch is that much smaller, or else the contact points have worn away sufficiently for food to jam in and impinge the septal tissues. By studying the models, we can see where a little grinding of the cusps will sometimes restore occlusal planes and contact points, but where this will not accomplish the desired results, the models will show where to separate and insert well-contoured fillings with good marginal ridges, which will restore in a measure the portions worn away from the proximal surfaces. The contact point should be placed in the center of the line of stress brought to bear by the occluding teeth, so that food will be carried over the embrasure and not irritate the gums. Also, the occlusal planes should be studied, and if there is any undue lateral stress, it should be corrected by grinding. Malocclusion produces constant pounding in some portion of the peridental membrane, thereby lessening its resistance to the infection of micro-organisms, which produces gingivitis, deeper seated inflammation and eventually pyorrhea, so that any tooth which is not occluding properly is prone to pyorrhea, or a lateral or peridental abscess. These conditions are especially noticeable where teeth are tipping forward, following the loss of the first permanent molar; the tissues adjacent to the medial aspect of the second molar usually present an inflamed area.

Before filling cavities on the proximal surfaces, the teeth should be separated widely enough to restore the contour which would be ideal in a newly erupted tooth. Slow separation started two weeks in advance is preferable to a mechanical separator used at the time of the operation. If immediate separation is used, it is impossible to gain the normal space, as a rule, and the patient is caused excruciating pain, and this method of separating does not give sufficient room or space for the dentist to accomplish ideal results, because the separator is always in the way. By tying contractal cord or waxed floss, wrapped with cotton, between the points of contact two or three times at intervals of two days, we can usually gain all the space necessary; then put in wedge of white base plate gutta percha and let the teeth rest for a week. Soreness quickly disappears, the operation can be done with a minimum amount of pain, and the operator has room and space enough in which to do ideal work, because he is not hindered by the separator being in the way, and the teeth stay apart long enough for a well-contoured filling or inlay to be inserted and polished. I have seen enamel checks, caused by the steel points of a mechanical separator, which are bound to develop into cavities sooner or later. If time is taken to explain to patients why it is necessary to separate the teeth before putting in the filling, they will want it done, and very few patients will allow a mechanical separator to be used after having had the teeth separated with the cord or floss. I frequently make a drawing on paper to represent teeth, showing where contact points have been lost through decay, and the necks of the teeth are drawn very close together to show patients why it is necessary to separate the teeth at the gingival margins in order to restore the normal contour to the crown of the tooth and permit good circulation to the septal tissues, as well as to protect them from injury in mastication.

Explain that hard and soft tooth structure has very little to do with the decay of teeth, that the enamel rods are composed of from eighty-eight to ninety-five per cent. calcium salts, bound together by a cement substance which is composed of even a higher percentage of lime salt, that enamel, whether hard or soft, is easily decalcified by the formation of acid upon its surface, and that acid usually forms under the debris, or protein plaque substance, which gathers on the tooth surface and is located only by a staining or discoloring solution. Dr. Pickerill claims that calcium salts held in solution by carbon dioxid in the saliva will neutralize the acid formed under debris, thus inhibiting decay of teeth, that these calcium salts will permeate the outer layer of enamel, and as the carbon dioxid is thrown off, the calcium salts precipitate in the enamel surface, thereby hardening it. A number of investigators along this line believe that calcium salts are really deposited and that there is a hardening of enamel when it is placed in a proper environment. Their theory is not in perfect harmony with Dr. Pickerill's ideas, but within a short time, I believe, we will have some definite information on this subject. Of course, when there is a sufficient quantity of calcium salts in the saliva to produce such results, decay cannot take place.

From childhood up to eighteen or twenty years of age, calcium salts are utilized in building bone. After that age, such large quantities are not needed for bone construction, and it becomes a waste product and is eliminated from the body. That which is eliminated through the saliva acts as a tooth preserving property. This probably accounts, in a measure, for the cessation of decay which usually follows when a person has reached maturity. Hence, from the time the teeth erupt until their owner arrives at the age of eighteen or twenty, they are much more prone to decay, and these are the ages during which thorough prophylaxis should be kept up.

One of the things most convincing to a patient is to paint the surfaces of his teeth with a disclosing solution. This will not stain clean surfaces unless partially decalcified. Give the patient a hand mirror and let him see how much accumulation there is on even apparently clean teeth. Explain that this is a bacterial formation, and that if as much infectious and decaying matter were allowed to remain in one place on his hand for weeks and weeks as is allowed to remain on the teeth, he would be very much surprised if the tissues surrounding such a mass did not become inflamed and hypersensitive, as often takes place with the tissues surrounding the teeth. While you are removing deposits and planing or filling rough surfaces and polishing them, explain the composition of enamel to the patient and that decay is merely the result of a chemical reaction between the calcium salts of the enamel and acids resulting from fermentation, just as the rusting of a piece of steel is a chemical reaction, and is just as preventable by polishing; how starch is converted into sugar, and sugar into acids, and that all dental caries takes place under a fermenting mass, and only there; that free acid in the saliva does not destroy the enamel, that no mouth wash can penetrate these fermenting masses, that no amount of brushing will entirely remove them and that improper brushing with an abrasive does a great deal of injury to the gums and tooth surfaces.

HANDLING A TOOTH BRUSH

Patients should be instructed to start brushing the occlusal surfaces of back teeth first, brushing the fissures with a backward, forward and side to side motion, then placing the brush well up on the gums, with the bristles pointing rootwise, and with a rolling motion, bringing the brush toward the occlusal surface. This should be done on both buccal and lingual surfaces. When brushing the lower teeth, the tongue should be drawn well back so as to expose the gingival third of the lingual surfaces of the lower molars and bicuspids to the bristles of the brush. For brushing the lingual surfaces of the anterior teeth, a very short brush should be used, because a large sized brush usually bridges over the inside of the arch and does not touch the teeth or gums, unless held in a perpendicular position. When brushes are held in this position, the bristles are sure to pierce through and lacerate and infect the gums, thereby causing gum recession. It is a very common thing for patients to start brushing in one place, usually with a cross-wise motion at the gingival margins of some of the anterior teeth. This should be watched for and stopped. Few people do too much brushing, but when they begin brushing with an abrasive and a stiff brush in the same place year after year, the grit, combined with the first stiffness of the brush, will gradually wear away the tooth at that point, so that I believe mechanical abrasion is frequently taken for erosion.

Dr. Bunting, of Ann Arbor, who has done a great deal of experimental work on the protein plaque substances which form on the tooth surfaces, claims that saponaceous substances are contra-indicated, because they lubricate the bristles of the brush or if used in combination with a grit, each atom of grit is encapsulated and loses its property of scouring or dislodging the plaques. I never have seen a case of erosion which was not accompanied by the use, or at least did not have a history of a stiff brush, gritty dentifrices and cross brushing. Enough brushes should be kept on hand all the time so that each brush is used only once during twenty-four hours. This gives the patient a brush which is at its prime, and by adding a new one to the stock of brushes every month or two, the gums are accustomed to a good stiff brush all the time, and are thus kept hard and healthy. Where only one brush is used until it is worn out, it loses its efficiency toward the latter end of its existence, and the gums become more or less inflamed from the debris which is allowed to remain at the gingival margins. Then, when a new brush is put into use, it lacerates the tissues which have become used to the softer brush. This alone is sufficient reason for requiring patients to keep three or four brushes on hand all the time, and brushes last much longer and do much better work when used only once in twenty-four hours.

The chief benefit derived from the use of the tooth brush is the hardened and healthy condition of the gums obtained from massage, but as far as effecting cleanliness is concerned, the brush is nothing but a series of fine tooth picks and removes only loose debris from the tooth surfaces. If improperly handled it does as much if not more damage than good. Of late years I have not favored dentifrices containing coarse grits, such as precipitated chalk, silex or pumice, because of the damage done to the tooth surfaces by improper brushing with them.

There is no tooth paste, powder or anything else which will keep teeth clean when simply applied by means of a brush, so that I try to have all of my patients go over their teeth with wooden points once or twice a week. The tooth brush should be used immediately after eating, because the protein substances of our food, if left too long on the teeth, become transformed into a gelatinous coating, which is difficult to remove.

Ribbon floss should be used to polish the proximal surfaces of the teeth at least once each day, and I recommend the application of a little paste or powder to the floss before using it. Care should be taken when passing tape between the contact points not to allow it to snap against the gum tissues. Snapping the gums can be avoided by taking a short hold of the tape, keeping it taut and holding the buccal end somewhat higher than the lingual, so that the tape passes diagonally between the contact points with sort of a saw motion.

There has been a good deal said about tooth picks, pro and con, one person advocating a quill and condemning a wooden tooth pick, and his next door neighbor holding just the opposite view. If food has jammed between the teeth, I would advocate the quickest means of getting it out, whether with silk floss or tooth picks, using care not to injure the gums, for it is commonly believed that a great deal of infection takes place through these little abraded surfaces. In fact, I think rubbing the tooth surfaces and gently massaging the gums with a wooden pick is productive of good results, for it stimulates the circulation and breaks up and removes microbic plaques and other debris. The pernicious habit of systematically jamming a tooth pick into interproximal spaces, crowding the gum tissue down and then giving the pick a twist, thereby lacerating and cutting the gums, should always be watched for and stopped, for the little pockets formed by the recession of the gums from this cause are places where debris lodges, and they make an ideal incubator for growing bacteria, thus infecting the gums and producing inflammation, which causes serumal deposits to gather and pyorrhea will follow.

EVERY DENTIST A SPECIALIST

These suggestions with reference to care of the teeth are intended for the every-day practice of every dentist, and not merely for the specialist in pyorrhea and oral prophylaxis, because this every-day care is what preserves teeth. I believe that the man who specializes in pyorrhea and prophylaxis and confines himself to the use of pyorrhea instruments and the polishing of teeth is not doing the best work he can in his community, when he depends upon men not associated with him to do the prosthetic work.

Nor do I believe this method of procedure will be successful in the dental profession, for no matter how skillfully the pyorrhea and prophylaxis specialist performs his work, it will be a failure in mouths which need repair work, unless the prosthetic man understands the causes which bring about diseased conditions of the mouth and is able to produce work which will carry out the ideals of oral hygiene. Otherwise, bands will be used where they are not indicated, and some of them not fitted overly well at that; work lacking proper contour to protect the soft tissues will be inserted; fillings, inlays, crowns and bridges which do not occlude properly or furnish support to the abutments will be constructed, thereby causing lateral stress on the process, followed by soreness, inflammation, infection and loss of the dental organs. Bridges which cannot be kept clean will be inserted, and great masses of food will lodge under them and ferment, thus making breeding places where millions of pathological germs will be incubated. The alveolar process under such a bridge frequently becomes infected, and large numbers of germs will be mixed with each morsel of food taken into the stomach. The loss of the teeth is sure to follow work done by men who do not follow out the principles necessary to maintain hygienic conditions. If teeth are lost after a specialist has once worked on them, it will be the fault of the specialist, from the viewpoint of the patient and the general practitioner, so that for these and many other reasons every dentist should be a practitioner of oral prophylaxis, if not a pyorrhea specialist. If more men practiced oral prophylaxis, there would not be as much need for repair work, for pyorrhea specialists, or M. D's., for the mouth is the intake of the body, and it is estimated that eighty-five per cent. of systemic diseases find their origin in foci which are located in the alveolar process, nose and tonsils, and it is believed that the gum tissues and the alveolar process which are infected from unclean tooth surfaces, are responsible for seventy-five per cent. of all these cases. In fact, it is a question whether a diseased mouth is not a source of infection for the tonsils.

ALIMENTARY INFECTION

The alimentary canal is about thirty-three feet long. We can control only about the first three inches of it. Let us do it well and keep it in a clean and healthy condition. The belief is quite prevalent among physicians that a great many pathological conditions of the body arise from a diseased alveolar process and gum tissues. When pyorrhea pockets and abscesses with sinuses are present, pus is discharged into the mouth, and every morsel of food and every drop of saliva swallowed carry quantities of infectious matter into the stomach. Probably few live bacteria ever get into the intestinal tract, because normal gastric juice with its one-half of one per cent. of H. Cl. possesses powerful germicidal properties, but the gastric follicles do not throw out the proper fluids when pus is present; so where pus is being swallowed continually, the food is not well prepared to enter the intestinal tract, and before it is eliminated from the body, it causes poisonous ferments to be formed and absorbed. This is also the case where food has not been masticated or ensalivated thoroughly. Uncooked starch is absolutely insoluble to any ferments of the human body, and when swallowed in that condition, it passes through the body absolutely unchanged. However, it acts as roughage, which is essential. Starch globules need to be cooked to break up their capsules, so that the ptyalin of the saliva, or the trypsen and the pancreatic juice of small intestines can act upon them, for it is only in this way that they become a food for the human being. Therefore, in order to have mastication which will preserve health, it is necessary to have twenty-eight good teeth which occlude properly and to know how to use them.

The larger percentage of infection from the alveolar process is that which takes a short cut directly into the circulation. If the infection cannot be combated rapidly enough, it may lodge and multiply in the joints, heart, or any area, the resistance of which may have been lessened, or enlarged or suppurating glands may result. Last, but not least, when masses of decaying matter are allowed to remain around the teeth, infection enters the tissues through the little ducts, glands, or openings which line the inner wall of the gingiva. These are described in Talbot's "Interstitial Gingivitis." The author also speaks of them as cul-de-sacs. Infection entering the tissues in this way frequently causes osteitis, osteomyelitis, lateral abscesses and pyorrhea.

Dr. Hartzell says: "The direct lymphatic drainage of the tissues contiguous to the teeth is the most perfect in the whole body, affording direct access to the deeper structures of the neck, maxilla and mediastinum, thereby making it possible for micro-organisms introduced into the tissues through a pyorrhea pocket or apical abscess to travel uninterruptedly into the deeper tissues of the body. Not only do the lymphatics afford direct access for micro-organisms to the circulation, but the rich plexus of blood vessels supplying the peridental membrane and alveolar process invariably suffer from the destructive activity of pus-forming bacteria, opening the blood vessels themselves to the entrance of germs which are injected into the broken ends of these vessels by the powerful stress of occlusion during the act of mastication, thus making the spread of bacteria in the circulation a certainty."

Some of the diseases for which the mouth infection is held partially responsible are: glossitis, diseased tonsils, deafness by infection through the Eustachian tubes, catarrh of the throat and alimentary canal, dyspepsia and indigestion, suppurating glands, infected endocarditis, septic inflammation of the joints, ulcer of the stomach, rheumatic conditions, pernicious anemia with all of its bad after-effects, tubercular glands and tuberculosis. Furthermore, diseased mouth and teeth always contain pathogenic bacteria, which would become dangerous to the person possessing them during a state of lowered resistance, and every time a person whose sputum is loaded with pathogenic bacteria expectorates, coughs or sneezes, he endangers those near him. Some people can have all kinds of debris on their teeth and mucous membrane of the mouth and gum, and yet show little tendency to decay or pyorrhea, but the constant swallowing of bacteria and their by-products must eventually have a debilitating effect upon the system.

TOOTH DESTRUCTION

Some of our authorities suggest the lactic acid theory for the decay of teeth, while others claim never to have been able to find lactic acid in the mouth or in the masses of debris under which decay takes place. Some claim that tooth destruction is the oxidation of foreign matter on the tooth surfaces, but they all acknowledge, and clinical observations verify the claim, that if it were possible to keep the teeth always clean and maintain proper occlusion, dental caries and pyorrhea would not exist, so that unless an individual is absolutely immune to dental pathological conditions, the cleaner his mouth and teeth are kept the less trouble he will have. Even though he is not immune to dental troubles, he will have more self-respect and command more respect from those with whom he comes in contact if he has a clean mouth, than if he allows it to become filthy and remain so.

Dr. Pickerill, in his "Prevention of Dental Caries and Oral Sepsis," claims decay of teeth can be controlled by increasing the quantity and alkalinity of the saliva, and that this can be accomplished by the use of acid mouth washes and a fruit diet, or at least a fruit course at the end of a meal. He gives several formulas for mouth washes, in which he uses potassium bitartrate, commonly known as cream of tartar. He calls it acid potassium tartrate. It leaves a very clean, pleasant effect in the mouth. He also says there is nothing better than a slice of orange with which to end each meal. Thus it seems it would be better to eat grape fruit or oranges at the end of each meal, instead of at the beginning.

PREVENTION

Some of our research workers claim that polishing of tooth surfaces is not scientific, and they are studying ways and means of preventing dental caries by systematic treatment. In the meantime, the teeth of most patients who are being treated in this way are wasting away. At present, our best known means of preventing dental troubles is oral prophylaxis. That means keeping a mouth, as well as the teeth, in a clean, healthy condition. In order to make a success of this work, a dentist must know from experience what clean teeth and a healthy mouth are, for his arguments lack force if he does not practice the teachings he desires his patients to follow. He must be able to convince his patients that preventive work is much more beneficial than repair work, and that nature's crowns, when in good alignment, properly formed and occluded, are better than the best porcelain and gold crowns he can make. Last, but not least, he must talk to them along the lines of preserving health, not those of simply saving a tooth. In the mind of the average individual a tooth amounts to very little, but if he realizes that that tooth, when in a diseased condition, may bring about pathological conditions which will result in chronic or possibly fatal diseases, he will pay a great deal of attention to keeping his teeth and mouth healthy, and that is what oral prophylaxis does.

A dentist must be able to present his subject in such a manner that the patient will be willing to pay a fee in compensation for the work done. Otherwise, a man will soon become discouraged and not carry out the technic necessary to get results, in which case his patients will say oral prophylaxis is not a success.

One of the first things to show a patient is the mass of fermenting substance on his teeth and teach him that tooth surfaces are one of the best bacterial incubators in the body and that all forms of micro-organisms can be found there. Hand him a mirror and let him see the surfaces of his teeth when painted with an iodin disclosing solution. Rinse the mouth immediately. Any discolored places should be polished until the disclosing solution finds nothing more to stain. It adheres only to foreign substances, and not to polished tooth surfaces.

Points, of two different shapes, held in Porte polishers, are necessary in a prophylaxis treatment. First, a broad, flat point to polish the distal surfaces of the last molars and buccal and lingual surfaces of the outer teeth, and second, a thin, sharp point to reach the interproximal surfaces near the points of contact. Dental tape is the only means of polishing one of the most vulnerable and inaccessible places, i.e., just gingivally to the contact point and its immediate vicinity. After we have gone over the teeth once, we should use the disclosing solution again, to make sure that all surfaces are clean. Of course, any substance which is not readily dislodged with a wooden point and fine abrasive should be removed with planes, scalers or files and the surfaces highly polished. I use nothing coarser than XXX silex in my prophylaxis work, because the coarser grits put scratches in the enamel, and these scratches are hard to polish out. It is well to put the most brilliant polish possible on the tooth surfaces, because a high polish prevents, in a measure, the adherence of foreign substances. For this high polishing I use Carmi-Lustro, tin oxid or rouge.

A great many cases of gingivitis are caused by the roughness of etched or improperly-developed enamel surfaces. Wherever these imperfections are present, they should be planed, filed or ground and then polished to a smooth, brilliant surface, for no patient can keep a rough surface clean. Slightly etched surfaces are detected only by careful hand polishing, aided by the use of the disclosing solution. Always explain to patients that if such surfaces are left, they will result in cavities, which will cost more money to fill than a prophylaxis treatment costs, and that a filled tooth is not nearly as valuable as a sound one.

Patients should be taught to handle the tooth brush properly and to use it after every meal, but even this will not keep the teeth clean. Within from three to six days after a prophylaxis treatment, the tongue will discover little rough patches, and the disclosing solution will verify the discoveries of the tongue.

Most of my patients rub their teeth and the mucous membrane of the cheeks and palate, and massage their gums with rolls of cotton held in a suitable holder. A hæmostat or a kuroris makes a very suitable instrument for holding these cotton rolls. In addition to the tooth brush, cotton roll holder and tape, patients are provided with polishers and points. Seventy-five per cent. of my patients have become quite proficient in handling these wooden points. I ask them to go over their own teeth twice a week. Many of them use the disclosing solution, and are able to get their teeth clean. Some patients may go for a year without a prophylaxis treatment, and yet, when they present themselves, their teeth are perfectly free from any kind of deposit. Others have to be seen every three or four months, and some every thirty days. Where patients are using the polishers, cotton rolls, dental floss and tooth brush, there is no definite rule for determining the periods of treatment. This must be gauged by the length of time they are able to keep their own mouths in a cleanly condition. The only way to tell definitely whether or not there is foreign substance on the teeth is to use the disclosing solution.

The only time a dental engine should be used in prophylaxis work is when it is necessary to grind cusps which malocclude, or to more quickly polish roughened or etched surfaces. When these places are sensitive, a forty per cent. solution of silver nitrate should be applied where discoloration is not objectionable, as on the back teeth; otherwise, a ten per cent. solution should be used. This stains only where decalcification has actually taken place. Deliquescent zinc chlorid or a saturated solution of potassium carbonate in glycerine helps to reduce sensitiveness to thermal changes and does not discolor the teeth, but causes considerable pain for about thirty seconds. Zinc chlorid should not be allowed to spread over the soft tissues, for it is an escharotic and causes soreness and sloughing.

The hand polisher and wooden points are preferable in subsequent treatments, because a revolving disc does the most wearing and polishing just exactly where the tooth brush and cotton rolls keep the teeth the cleanest. Also, if the revolving disc and brush wheel are allowed to touch the gums, they cut them, making places for the entrance of pathogenic bacteria, and the tissues, in healing, form scars which always contract, thus starting recession of the gums. Sometimes we see gum tissue which presents a dull pink color, thickened margins and a mottled leathery surface, with little if any capillary circulation. I think this is a sort of callous which nature has produced to protect the tissue from infection when abused by a tooth brush, just as a callous will form on the hand from hard work. It is very hard to make vapor penetrate this tissue, and sometimes it is not possible to get it in until the third or fourth treatment, but if vigorous brushing is stopped and the vapor treatments kept up, the callous tissue will gradually disappear, and tissue which has a good circulation will take its place.

Realizing the pathological conditions which result from neglected mouths, it ought not to bother any one to convince intelligent patients that a modern, up-to-date dentist is striving for much greater results than merely that of saving teeth by repair work, and he should have no trouble in introducing oral prophylaxis into his practice and obtaining a fee which would compensate him for devoting the necessary time to accomplish good results.

Frequently patients say they realize these things, but when they get away from the office they procrastinate or forget altogether. They should be informed that we keep a regular "call up list" for reminding patients when they are due for their prophylaxis treatments. I keep a card system for this, a box containing monthly index cards, i.e., cards bearing the names of the months, also some small cards, about the size of a calling card, for the names of the patients. Each patient's card gives the period between treatments, i.e., "one month," "two months," "three months," etc. If a case is finished in January and you wish to see the patient in thirty days, his card is put in the February space. At the beginning of February, all the cards are taken out of the February space, appointments made, and the cards are distributed in the index box again according to period designated, i.e., the cards marked "one month" are put in the March space, the cards marked "two months" are put into the April space, and so on. The first of each month all the cards in the space for that month are taken out, appointments made and the cards redistributed, and so on through the entire year. This system has several advantages. It enables the dentist to take better care of his patients, holds his practice together, and if he has taken an extended vacation, it gives him a list of patients to call up as soon as he returns.

It is well to get to working for children before they have cavities or have ever suffered dental pain, if it is possible. Also discourage parents or grown people from discussing painful dental operations before children. Above all, never tell a child a wrong story. If it becomes necessary to do work which will be painful, call upon the child's manhood or womanhood to stand what is necessary, and then do the work as gently and quickly as you possibly can.

There are a number of methods of alleviating pain, such as analgesia, conductive anesthesia, novocain injections into the peridental membrane, etc., and they all save pain and help to build up a practice. Temp, carbol-eugenol or eugenol and zinc oxid, incorporated with cotton, can be used for a temporary filling. Any one of these dressings stops the pain, arrests decay, separates the teeth and crowds the gums back so that we can get at the gingival margin of the cavity, and a week or two later a permanent filling can be inserted less painfully for the little patient.

FOCAL INFECTION—A PLEA FOR CONSERVATION*

BY F. J. DESPECHER, D.D.S., OMAHA, NEB.

IN PRESENTING this paper to you, I do not aim to give you a solution of the grevious question under discussion, nor do I want you to believe that I am opposed to progress, and that I am adhering to old theories because I do not want to admit the new ones. I also will not touch the technicality of operation and mode of treatment, leaving that to the purely dental meetings. I only want to try and explain to you why I am opposed to radicalism, and also make a plea for sound judgment in adopting all the new ideas and theories which are coming to us from the different scientific laboratories.

In approaching this subject I falter before its magnitude, and the incertitude which is felt existing in all its phases, making it almost impossible to adequately treat it from a negative stand, which so many of us would like to be justified in taking.

Dr. Adolph Sachs, in his very able paper and essay on the focal infection taking place at the apex of roots of teeth from which the pulp had disappeared for some cause or other, gave us the pathology and the subsequent results from these infections upon the health of the individuals in whose mouth these conditions obtain. The results of these infections from a pathologic and bacteriologic viewpoint, are undeniable, and we find at every turn the effects of the morbific influence of these focal infections, showing in the impaired health of many individuals.

Dr. A. F. Tyler gave us indubitable radiographic proofs of the presence of these foci of infection and results in some cases of their morbific influences. However, there are *many more* individuals who do not seem to suffer from these conditions, although having apparently these focal areas of pathogenic liabilities, than those whose health is impaired by their influence.

I will not take up the study of the various kinds of bacteria or of the protein, the ferments and their action, or whether these micro-organisms are differentiating in their selection of tissues. I am very much interested, as are we all, in the researches carried on by men especially fitted for such work, who are making such far-reaching discoveries, and whose deductions and opinions are revolutionizing the practice of medicine and dentistry. What is of most moment to me now, is the thought that I find uppermost in the mind of every thinking member of the dental profession, which one meets and has met for the past two years; this thought, most overbearing and most worrying, too, expressed on all sides with anxious looks: *What shall we do with these pulpless teeth?*

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*Read before the Odontological Society of Omaha, in answer to a paper on focal infection, read before that body by Doctor Adolph Sachs, M.D., during a series of meetings where many medical men had been invited to discuss the subject of focal infection.

I feel that today the important point before the medical and dental professions is how far shall we go? or how little shall we do? And that there is one light which is shining brighter every moment, which is before all of us omnipotent and which is growing to such force that all must recognize it. That is the care of the young, the prevention of these conditions which are so intolerable and injurious to the health of many, and to which we are all liable, and which could be obviated in many cases.

When these joint meetings between the physicians and dentists were thought of, it was to meet a condition which has been fast arising, and which has been very vexatious from both a medical and dental point of view. We as dentists have always endeavored to save an organ which is so indispensable to the proper mastication of the food ingested. We have been very jealous of our work, and of the field of our efforts. Until recently we would have called criminal the extraction of teeth as practiced today. We believed that we could save all the pulpless teeth to advantage, and the treatment of pyorrhea was practiced by many earnest men who believe, and in many instances still believe, that the results obtained were gratifying and that the individuals treated were benefited; in fact, that their health would be much enhanced by the better condition of their teeth and that all their digestive troubles would be eliminated. Today what a difference! we are tearing down the work of years and our theories are all demolished. We are extracting right and left for fear that we are not extracting enough, and that any chance of focal infection may be removed.

Only a few days ago in speaking with a prominent member of the dental profession who came to Omaha to give instruction to a local organization, I asked him: "What do you do with pulpless teeth?" "Extract them;" was his vehement answer; "they are all bad. You can't show me one from which streptococcus cultures are not possible." He calls himself a radical. Is he right?

I had the good fortune, a few weeks ago, of visiting Doctor Herman Prinz, also the laboratories of Doctor Weston A. Price. These two prominent researchers do not seem to agree as to the sterilization of infected roots. It is Rosenow, I believe, who claims to prove that the cultures taken from certain tissues have a predilection for like tissues. From all I have heard and have read during the last few years, we are following a fast-moving evolution, the strides of which are exceedingly hard to keep pace with.

I was speaking recently to a gentleman who had written an article published in one of our leading magazines only three months ago, and which was undoubtedly the expression of his views of five or six months past. During our conversation I was surprised to find that his views had materially changed since then, and that he was very doubtful of the advisability of some of the operations described.

I am deducting from all these remarks that the men who are conducting these researches are yet very undecided as to the results of their labors; outside of the bacteriologic and pathologic facts brought to light showing the etiology of many morbific conditions heretofore obscure, we have no solution suggested as positive, but extraction. Are we warranted as dentists in resorting to this extreme, and are the physicians right in asking that we should extract?

This question is undoubtedly impossible to answer either affirmatively or negatively with the limited knowledge at hand. From the bacteriologist and pathologist point of view there is no doubt of the infectious possibilities of these apical areas and that cultures can be made from the tissues constituting the affected roots. They claim to demonstrate pathologic conditions, and that their asepsis is positively impossible for more than a very short period of time. In theory the retention by the system of these dead organs is impossible; they would slough off and be cast away, or show some of the signs of the means employed by nature to rid the system of the individual of such condition. Yet on the contrary, I believe that from clinical observation we see on all sides, the efforts that nature is making to keep in use these organs which have been provided to accomplish one of the most important parts of digestion.

There is no question in my mind that in many instances extraction is the only solution and that there should be no hesitancy, with the knowledge which we have, to sacrifice a tooth that we had thought perfectly healthy. But on the other hand, I believe that there are teeth extracted today that we are not warranted in extracting, and that we should endeavor to retain, at least until we are certain of our inability to accomplish otherwise the desired results. I mean to make a plea for conservation, and stay the hand of radicalism.

I have practiced dentistry for over thirty years and during this long period I have seen the pendulum of radicalism and cock-suredness swing from one side to the other with unmistakable regularity.

How many of the men who only a few years ago claimed that all teeth to be crowned should be devitalized, would tell me now what they told me many times, that I was a back number because I objected to this process, and would look at me with contempt? How many are practicing their view of yesterday?

I can show you many articles claiming that it was malpractice not to devitalize teeth to be crowned. These very same men today are in many instances advocating the extraction of all pulpless teeth. They are, I believe, clamoring for extraction to atone for their views of yore, and letting radicalism take a new flight. Only a few years ago did we see apendectomy practiced very indiscriminately; today are there as many appendices removed? The same about tonsils; this organ was accused of being the cause of all trouble—now it is the teeth, and it will go on forever. There will be men who will push all these new theories to the extreme, and we undoubtedly will find fallacious many of the axioms which now we take for granted.

I want by this paper to make a plea to you for co-operation in the co-ordination of the resources of both the medical and dental professions. As individuals and co-workers we have some very pertinent facts to face. First of all we must not let the knowledge of certain conditions get the best of our judgment, and we must consider that there are many factors entering in the reasons for arriving at a decision one way or the other.

We must remember that there are many people with teeth seemingly perfect who are suffering from disorders which today are imputed to the teeth; there are also edentulous individuals who have lost their teeth in youth who are similiarly affected. We also have those who are in apparently perfect health, who have very bad teeth. Most people who are blessed with longevity are not blessed with good teeth. We must not loose sight of the millions of people who have existed and lived to ripe old age having many foci of infection in their mouths. *These are outnumbering by many millions those who have carried their teeth to their graves without any focal infection.*

I have no doubt that many of you are thinking as puerile the remarks I am making, that since we know now what these infections are causing, we ought to remove them; but are we omnipotently wise in removing these organs which nature has placed in our mouth, just because we believe that they are incompatible to our system, losing sight of the fact that nature has provided for these conditions, and requires these organs for subsistence?

I do not want you to believe that I am not in sympathy with the movement to better this condition; on the contrary my whole professional life and my efforts of years have been exerted to remedy according to my ability these conditions in my patients. I only want to make a plea for a middle-of-the-road course, a plea for rationality, and to exert a preservative influence, at least during this stage of uncertainty.

I have collected a few specimen slides that I will show you later on. I believe that they will help to make you feel as I do, and give you an idea why I am hesitating to follow the radicals, and why I hope that a solution is in store for us. I am going to give you a few clinical cases which have presented themselves to my mind.

I was called about twenty-two years ago to take care of the mouth of a lady who was dying, supposedly of tuberculosis; her physician told me that she had tuberculosis of the joints. He was a man well and favorably known to the profession in Omaha. The patient was then about 30 years old. I was sent for because the odor coming from her mouth was so fetid that her attendants were not able to stand it. I found her mouth in a deplorable condition. The patient was in bed, unable to sit up, pus oozing in great quantity at the gingival margin of all her teeth. I had said previously to her attendants who had spoken of her to me that she must have pyorrhea, and had suggested treatment, but the state of her health was considered such that the treatments would have been too much for her to stand. When asked to look after her I was told that she had only a few days to live, and only to try to relieve the condition as much as possible. I set to work and only gave a short treatment, the patient being unable to stand any more. The next day I was called, as the benefit of the treatment was apparent from the attendants' point of view. After having given these treatments for several days the doctor told me that he believed the patient was stronger, and at her earnest request, treatment followed regularly for several weeks. At the end of this period I removed two or three of the most affected teeth and continued treatments for over a year. This patient was absent from Omaha for a long interval, and I had the pleasure of seeing her about a year ago. She seems well and hearty, and has lost only one tooth since then. She has been very assiduous in the care of her teeth. In the light of our present knowledge, would I have extracted those teeth?

Another lady who had been suffering from severe pains and complication was directed to me some fifteen years ago by her physician for the extraction of her teeth. I refused, in the belief, after careful examination, that the teeth were not responsible for her trouble. This lady was called about this time to California. About ten years later she returned and I was called upon to make her a denture. She told me that after reaching San Francisco her troubles returned, aggravated, and that she was again avised to have her teeth extracted. This was done. She is wearing plates now, and has digestive disorders, her dentures being only of little use to her on account of the form of her mouth; she is still suffering from the old affliction with no relief.

A lady in a local hospital suffering from some heart lesion of an aggravated condition, also afflicted with an advanced case of pyorrhea, with profused suppuration, was much benefited by a few treatments which were never carried to a successful end.

A lady was referred by her physician with instructions to extract several teeth. I extracted only one tooth and began the treatment of several others with an immediate cessation of all symptoms. Later it was considered advisable to extract a molar which could not be advantageously fixed, and the amputation of the root of another tooth under treatment was resorted to. The patient seems in perfect health and no old symptoms have recurred.

I have under my care now many aggravated cases of pyorrhea of long standing where extensive suppuration had taken place before treatments were begun. These people seem to show no symptoms of deleterious influences upon their health. Many of these cases have been under my care for years.

I will show you many radiographs taken of teeth affected and the results after treatment. I am not showing you this to demonstrate what I can do, but with the idea in mind of showing what may happen and the possibility of treatment.

In this poor endeavor to answer Dr. Sach's scientific paper, I want to bring before you my reasons for hesitating to resort to extraction in many cases. I know that after amputation of roots I have seen the symptoms of derangements in the individuals treated disappear entirely. Should I have extracted that tooth which may do service for many years?

The first amputation I made was on a lateral in the mouth of a school teacher. I extracted that tooth seventeen years afterwards, not because it caused trouble, but on account of so many of the other teeth having given way that a plate was indicated. I wished I had known then of X-rays and had taken the radiograph of that tooth. I am told by many that amputation is not successful because it leaves a field for reinfection; that the tubules and canaliculus of the root cannot be sterilized, and that cultures of pyogenic micro-organisms can always be made from these roots. Yet we find adhering to these roots large areas of perfectly healthy macroscopically looking peridental membranes. I have not made or heard of cultures being made from these membranes, that continue their function of holding the tooth *in situ*, notwithstanding the fact that they are adhering to a supposedly pathologic tissue, and which theoretically should cause their infection and destruction.

Could we have, if this infection obtained, a proliferation of bone cells and an apparent resumption of the healthy performance of nature's recuperative function? Could the bone and cancellous tissues fill the cavity previously occupied by the granulomas, and come into seemingly perfect juxtaposition with the amputated root end, as shown in some of the slides which will follow?

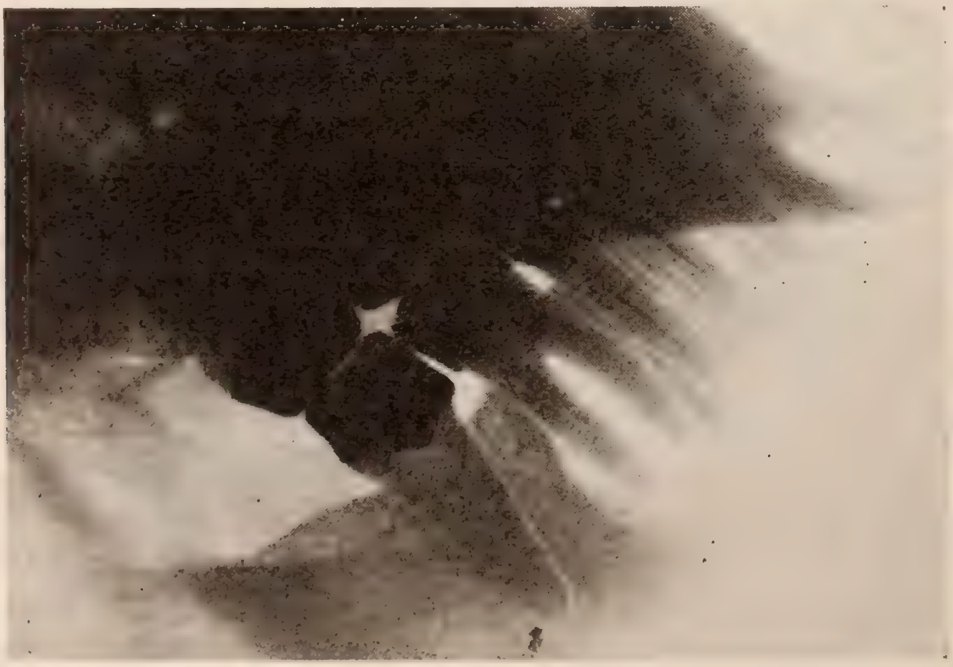


Fig. 1—Lower molar showing large area of destroyed tissues, tooth exceedingly loose with much suppuration.

We have an instance, as you will see, Fig. 1, where suppuration has taken place in an extensive area, and where the case showed all signs of being hopeless, yet look at the results! We must take into account in many of these radiographic diagnoses the unreliability of this means of knowledge. There is a certain class of cases which seems to escape the critical eye of many physicians, but which I would like to have explained. I am referring to the roots of teeth which are undergoing, or have at one time or another undergone, a process of absorption.

We frequently see the radiograph of these cases showing, on close examination, a marked absorption of the apex of the root, often leaving the filling material with which the root was filled projecting deeply into the tissues which have been reformed around it. These cases usually show an indistinct demarcation of where the root terminates, due to the irregularity of the progress of absorption, leaving the root jagged. The bone structure is plainly visible, showing a marked cancellous formation characteristic of alveolar tissue. This growth is thoroughly adapted to the root end and shows no rarified area, the membranes carrying the osteoclasts responsible for the absorption, is apparently of normal proportion and is not discernable in all appearance from a normal condition. There is seemingly a healthy condition which, according to our accepted theory, cannot be if we have an infection existing.

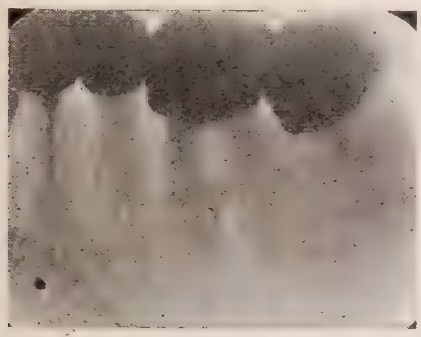


Fig. 2

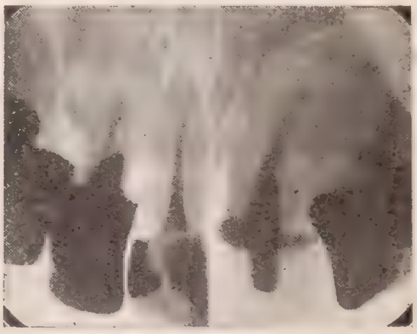


Fig. 3

Fig. 2—Same tooth after the roots have been treated and refilled. This radiograph was taken ten months after the patient had been dismissed.

Fig. 3—Before amputation.

Is the physician ready to condemn all pulpless teeth irrespective of the health of the patients? We must be careful not to give an impetus to extraction by too free a condemnation of these teeth, unless we are ready to see some over-zealous dentists extract all teeth that are pulpless whenever they present themselves. Are we to abandon all treatment of affected pulps and also extract all teeth affected with gingivitis or incipient pyorrhea?

I opine that in all the cases which show unmistakably the secondary effects of focal infection, we should carefully consider the case and only extract the members which in our opinion are causing the trouble, and refer the patient back to the physician for surveilance, giving an opportunity to observe any clinical changes. I have found in many cases that trouble was seemingly caused by only one focus, and that further extraction was not necessary, only if preventive reasons were taken in consideration. We must bear in mind, following this latter course, that there is a great uncertainty about these conditions, and that researchers are continually giving rise to new ideas which do not always fit in with what they have found previously, and that we may deprive needlessly the patients of teeth which are giving good masticating services, and which we may find in a very short time can be successfully treated.

Fig. 4

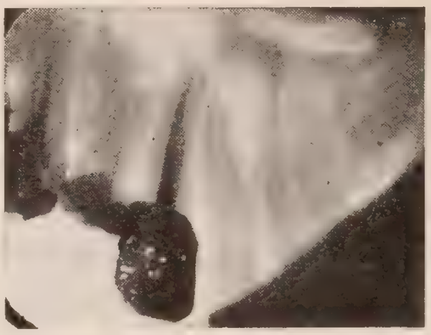


Fig. 5

Fig. 4—Same tooth. Four months later.

After careful consideration and review of the sum total of what I have gleaned, I find that from a bacteriological point of view, under favorable conditions most any kind of germ may become pyogenic and cause an infection. That the streptococcus viridans group are most frequently found in the chronic dental infection; that the streptococcus pneumococcus are believed by Rosenow, I think, to cause the secondary infection; that there are many other groups of ærobic and anærobic micro-organisms that seem to have but little effect on the system under ordinary conditions, and that there is no definite information relative to the effect of all or any of these organisms causing pathologic conditions, only the theory, which is undoubtedly well founded, that wherever we see any signs of their possible existence, suspicion is in order and that all care should be taken that no deleterious condition relative to health exists in the individual.

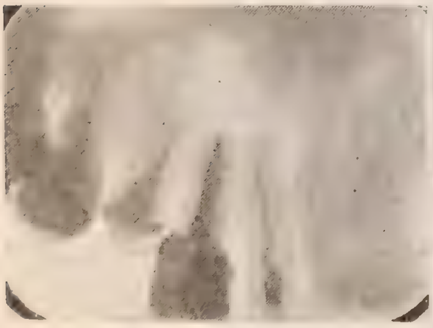


Fig. 6

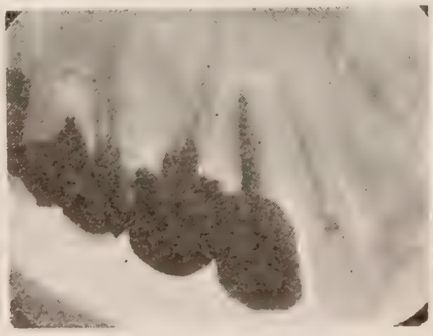


Fig. 7

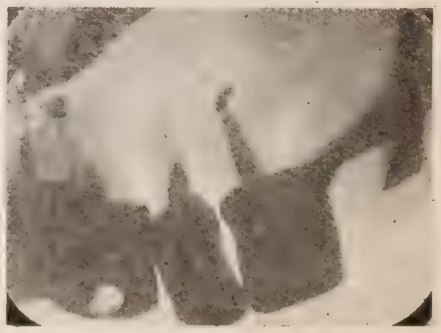


Fig. 8

Fig. 6—Five months later than Fig. 5 after amputation.

Rarefied areas shown by the radiograph are only indications of a pathologic area not necessarily of a virulent morbific order. I have come to the conclusion by careful analysis of the cases under my own observance, and by the results obtained, that of all the numerous cases of apical infections shown by the radiographs, there are only a very limited number which cause serious trouble. I firmly believe that many of these rarefied areas, showing that apical disturbance has occurred at some time or other, are in an innocuous state; either that the infective organisms have no proper pabulum, that their propagative properties are latent, or that the system has thrown tissues or antibodies around these areas which does not permit of their migrations. Whatever the reason, the teeth thus affected are not causing any injury to the individual, and may be of great assistance to proper mastication. In my practice I insist that radiographs be taken of all suspicious teeth, and I have had the opportunity of examining over 5,000 films which ordinarily show more than one tooth each. I believe that of all these people, ninety-nine per cent. have shown one or more signs of parulis having occurred, and that if all these areas were diffusing toxins through their bodies they should have been a sick lot.

I am always careful to ask before examining the mouth of patients whether their health is good, and if not, what is the nature of their ailment. I find only a small percentage of these people who do not seem and feel in good health, and yet very few are free from these affected areas. I have also found that whenever I have had to deal with individuals who were suffering from disturbances attributed to focal infection caused by some apical condition, that it was just one tooth or one root of a certain tooth which caused all the mischief, and after that area was removed, either by extraction or by amputation, the disorder ceased almost immediately. An occurrence which we all have seen in so many cases.

I will resume by making a few suggestions as they have presented themselves to me. I will first speak of the mode of procedure which I think rational under the circumstances as they are today:

First: That radiographs should be taken of all teeth which are suspicious; in many cases the whole denture should be radiographed.

Second: That the health of the individual should be inquired about. If found unsound, the patient should be referred to the family physician or a diagnostician for further examination, with a report of the pathologic areas found. This for the purpose of knowing how far we should go, and also to watch the effects of oral treatment on the patient's health.

Third: A careful diagnosis should be made of each root affected to determine, if possible, which is the offending organ. It might involve the medication of several root canals, being careful to open only one tooth at a time.

Fourth: After careful deliberation the extraction or amputation of the root or root ends of the suspected tooth should be proceeded with, and the patient referred to his physician for surveilance. If no results are obtained, the tooth which we had decided as the next to look into should be attended to and so on, until we have struck the right one. It usually will be found that the trouble will disappear after the extraction or treatment of a certain root, and that the removal of the other focal infection had no effect on the health of the patient.

Fifth: Then the mouth of the patient should be put in as perfect condition as possible and prophylactic treatments carefully pursued; the patient should also be kept under the surveilance of the physician for detection of recurring symptoms.

I believe this rational and not dangerous to the individual's health, as usually a patient forewarned will very soon come back if any alarming signs are felt, and as the disorders disappear quickly upon proper treatment if taken in time, it seems to me the better policy is to keep in place teeth that are serviceable, both from an esthetic and physiologic point of view.

We must all unite in preaching the care of the young. If children were brought to the dentists early and regularly enough many of the future pulpless teeth would be retained in a healthy condition; the physician has a better opportunity to impress this on the parent than anybody else, and should never loose the occasion of doing so.

In finishing I want to make a plea for better dentistry. The physicians should educate themselves to be able to recognize the best when they see it. A course in the rudiments of dentistry should be given in all colleges of medicine.

The physician should insist on prophylactic measures being taken by all their patients, and educate them to frequent visits to their dentists. The preventive care of the teeth is advocated by the best men in this country and many are practicing exclusively preventive dentistry, and undoubtedly are very successful in conserving the mouths of their patients and their general health in good condition.

In conclusion I beg you all to try and co-operate more thoroughly in your relations between the two professions. Since we find that the mouth brings us in so close relation, and that the teeth are so important to the physical condition of mankind, both as the main agents to properly prepare food for digestion and also as the cause of many morbific conditions, it seems of the most importance that we should work hand in hand to remove all sources of misunderstanding and conflict in views, and endeavor to unify our efforts toward the same end. I mean the best results obtainable from the patient's side of the question; that is, not to lose sight that the patient's health and comfort may be endangered both by keeping teeth in the mouth that are causing pathologic disturbances, and also that the loss of these organs is impairing digestion. In other words, we must concentrate our efforts toward keeping all the teeth that are not injurious and object to the extraction of many useful organs for preventive reasons only.

A retentive memory may be a good thing, but the ability to forget is the true token of greatness.—*Elbert Hubbard.*

WHY DRAFTED DENTAL STUDENTS SHOULD BE PERMITTED TO FINISH THEIR COURSES

Certain data which have been gathered for the information of those interested in the maintenance of ample dental service for the United States Army.

A FEW WEEKS after the United States joined the Allies in the war against Germany it was announced on seemingly good authority in Washington that it was the desire of the Surgeon General's Office and the War Department that all medical and dental students should continue their studies and that they certainly would not be called into service until after graduation. It was apparently appreciated that there would be an ever increasing demand for more and more physicians and dentists, and as no one could foretell the duration of the war, it seemed that the production of physicians and dentists should not be reduced. The United States was to profit by the example of England, France and Canada, and would not make the mistake of sending partly trained medical men to the front in the line service. The announcement became common knowledge throughout the country and such sensible action was generally accepted as right.

It was not until after the registration for the draft that the War Department apparently became frightened over the problem of class exemptions, and announced that no exemptions would be made except those provided by law. Pressure was immediately brought by the medical profession and after weeks of argument, an order was issued by General Crowder on August 29, 1917, that hospital interns and fourth, third and second year medical students who were called into service might enlist in the Enlisted Reserve Corps (Regulations for the Enlisted Reserve Corps, Act of June 3, 1916) and permitted to complete their course. *This act does not grant exemption. It holds the men in the Reserve Corps, subject to call.*

It was generally presumed that the dental service was considered a valuable and necessary part of the medical service of the army and that dental students would be included in such an order. It was therefore a surprise to both physicians and dentists throughout the country that dental students were omitted.

DENTISTRY'S ARGUMENT

While practically every argument which has been presented favoring the temporary exemption of medical students applies to dental students as well, the following information has been gathered by the Committee of Deans of the Dental Colleges of the United States for those who may be interested, as applying more especially to dental students.

NO LEGAL OBSTACLE TO ISSUANCE OF DENTAL ORDER

There is no legal obstacle to the issuance of an order for dental students similar to that issued for medical students. The regulation specifies that "Engineer, Signal and Quartermasters' Corps and the Ordnance and Medical Departments of the Regular Army" may have such Enlisted Reserve Corps. As the army dental service is one of the medical departments, it might be included in such an order. *Attention is called to the fact that the issuance of such an order would not "let down the bars" to an endless line of similar orders, as the regulations referred to apply to but the three corps and two departments above mentioned.*

EFFECT OF DRAFT ON DENTAL STUDENTS

At the request of this committee the deans of a majority of the dental schools throughout the country sent blanks to all underclassmen of last year to be filled in and returned direct to the chairman of this committee. Each dean was also requested to report the number of those in attendance in each class last year and to give his best estimate of the number who will matriculate in the freshman class this fall.

From the blanks returned the following table has been prepared:

Total number of underclassmen in dental schools last year	7624
Number to whom blanks were mailed	6510
Number of blanks returned to date	4414
Number not of draft age, or alien	1248
Number in draft	3170
In first call	756
Accepted	556
Rejected	200
Percentage of all students called in first draft	17.1
Percentage of students of draft age who were called in first draft	24.0
Percentage of all students accepted in first call	12.6
Percentage of drafted students accepted in first call	17.2
Percentage of all students who have volunteered in army or navy	5.0
Total number of students of last year who will be accepted through the draft at above percentage rate	960
Total number of students of last year who have volunteered	381
Total number entering army through first draft or as volunteers	1341
Total freshmen matriculated in all schools last year	4184
Estimate of freshmen this year	1330

From the above it will be noticed that a total of 1341 students have already been taken from the classes which will graduate in 1918 and 1919.

From the reports, it is safe to estimate that the second call will take as many as the first. Several schools report having already received many letters from this group stating that they will not return, as they do not wish to go to the expense in time and money with the chances so greatly against their being permitted to complete another year's work. Even presuming that the next draft does not come until late next spring (so that those who do attend might receive credit for the year's work), it seems a fair estimate that at least 5%, in addition to those drafted and volunteered, of the graduating class of 1918 will not return this fall because of the second call, and that the full 12.6% for the second call may properly be deducted from the class of 1919, as they will not reach graduation. It is to be presumed that at least a third draft will also be made before this class graduates, making a similar further reduction. We must also deduct an additional 10% from the class of 1918, and at least 15% from the class of 1919 to cover the normal loss in these classes from many causes—sickness, faculty action, financial difficulties, etc.

On these calculations, the effect of the draft, plus the normal loss, will be to take in the neighborhood of 1121 students from the class of 1918, and 2417 students from the class of 1919.

Owing to the fact that all dental schools have extended their courses from three to four years, beginning this fall, there will be no graduating classes in 1920.

It will be noted that the class of 1921 (freshman class of this fall) will be about one-third of last year's class, this reduction being undoubtedly due in large measure to the draft.

SUPPLY OF DENTAL STUDENTS ALREADY LESS THAN DEMAND

On account of the development of the important relationship of mouth infections to general health, and the education of our people to the value of healthy mouths, the demand for dental service has increased much faster in recent years than the supply of dentists. Therefore, under the most favorable conditions, it would be impossible for the dental schools of the country to turn out during the next five years as many dentists as will be needed. If the army takes all it needs, the civilian population must suffer. It therefore seems almost imperative that the greatest possible number of dentists should be graduated.

The number of graduates from all of the dental schools of the United States for the past five years was as follows:

1913	2,022
1914	2,254
1915	2,388
1916	2,835
1917	2,989
Total	12,488

This is an average of 2,497 per year.

The best estimate that can now be made for the next five years is as follows:

1918	2,319
1919	1,767
1920	practically none
1921	1,000
1922	800
Total	5,886

This is an average of 1177 per year.

It is thus apparent that the effect of the draft will be to reduce the number of graduates for the next five years to about one-half the number graduated during the past five years, and it will necessarily be four years after the close of the war before the graduating classes will begin to increase again in numbers.

Attention is called to the following affidavit stating the effect of three years of war on the dental service of Canada.

"I, A. E. Webster, M.D., D.D.S., L.D.S., Dean of the Royal College of Dental Surgeons of Ontario, of the City of Toronto in the County of York, do solemnly swear, that,

"1. Three years of war under the voluntary system of recruiting has reduced the number of dentists in practice in Canada by one-fifth. The dental colleges with all possible effort have not been able to supply the demands of civil practice. Dental assistants for the army are supplied from the physically fit dental students while the unfit graduate to supply the places of those who have left civil practice to join the army.

"2. Dentistry is an admitted necessity, especially in the army.

"3. It is my opinion based upon experience that a larger than normal supply of dental students should be admitted to the dental colleges to supply dental assistants for the army and graduates to take the places in civil practice of experienced dentists who take up military practice. And I make this solemn Declaration conscientiously, believing it to be true and knowing that it is of the same force and effect as if made under oath, and by virtue of 'The Canada Evidence Act.'"

A. E. WEBSTER, M.D., D.D.S., L.D.S.

"Declared before me at the City of Toronto, in the County of York, this 31st day of July, A. D., 1917." E. T. COATSWORTH,

[SEAL] A Notary Public in and for the Province of Ontario.

PRESENT RATIO OF ARMY DENTISTS INADEQUATE

The following is quoted from an editorial in the September *Dental Cosmos:* "The government has provided for a corps of army and navy dental surgeons in the ratio of one dental surgeon to every one thousand enlisted men. Carefully computed statistical data tend to show that the average available working time of a dentist is about two thousand hours per year, upon the basis of which it appears that the government has made provision for an average of one hour of dental service every six months for each enlisted man—an amount of time wholly inadequate for the work required to be done. Any dentist who is giving full and efficient service to five hundred patients per year is in full practice. No dentist can give proper service in accordance with modern standards of practice to one thousand patients per year. To attempt to serve that number under army conditions tends to lower the standard of the service itself and is demoralizing to those who are engaged therein."

Every dentist who has studied this problem knows that there should be at least one dentist for each 500 men in the army; just double the present number of dentists. A bill is now being prepared for presentation in Congress which provides for this increase. Obviously there should be foresight to have ready not only the one to one thousand now provided for, but also the more adequate service which will very likely be provided for by law.

DENTAL PROFESSION HAS SHOWN FINE PATRIOTISM

In spite of the fact that the Washington authorities have shown little tendency to recognize the value of the services of the dental profession, its members have exhibited as fine a spirit of patriotism as any class of citizens possibly could. Realizing the very bad condition of the mouths of many conscripts and the inadequacy of the government service, the dental schools throughout the country have thrown open wide the doors of their clinic rooms and have, without charge to men or government, cared for the mouths of both conscripts and those who were refused enlistment on account of the conditions of their teeth. There has also been organized the Preparedness League of American Dentists, consisting of thousands of dentists throughout the country, and these men have, in private offices and elsewhere, given their services to the army men. By this gratuitous service the dental profession has made possible the enlistment of several times the number of men (who would otherwise have been rejected) that will be called from the dental schools by the draft.

It should also be mentioned that large numbers of dental students offered to enlist in the various base hospital units and other branches of army and navy service, and they were almost universally advised that they would render the most patriotic service by remaining in school. Many were thus deprived of entering officers' training camps and branches of service for which they had some special qualification.

GENERAL CROWDER ON THE VALUE OF DENTAL SERVICE

General Crowder recently wrote to the governors of five eastern states a very strong letter in which he emphasized the great need of dental service in the army, and the inadequacy of the present service of one dentist to one thousand enlisted men. He urged that measures be carried out to put the mouths of conscripts in the best possible condition before they were sent to the various camps. This letter was written to ask for the co-operation of the governors and local boards to the end that the conscripts might be promptly notified to report for mouth examinations. It was expected that a copy of the letter would be inserted in this report, but it has not been received at the time of going to press.

DENTISTRY A BRANCH OF MEDICINE

It would seem almost unnecessary to call attention to the fact that dentistry is a very integral part of medicine. Dentistry has been taught in separate schools because the technical procedures require special teaching and clinical facilities. The courses in dentistry have gradually included more and more of the fundamental branches of medicine until today the medical school courses in anatomy, histology, physiology, chemistry, general pathology, bacteriology, etc., are very closely duplicated in dental schools. The entrance requirements for dental schools have been raised to graduation from a four-year high school accredited to the state university and the dental course has been lengthened to four years.

The developments of recent years of the role that mouth infection plays in relation to general health have served to connect dental and medical service in the most intimate way. A review of the medical journals of the past five years will reveal more references to mouth infections as the cause of various disabilities than any other single source. When attention is called to the large percentage of cases of rheumatism, nephritis, appendicitis, inflammation of eyes, of heart muscles, etc., as a result of chronic mouth infections, it is appreciated that thousands of men have been exempted from the draft because of mouth infections, and thousands more who are accepted will doubtless be incapacitated from lack of adequate dental service. Couple this with the reports from Europe that the face and head wounds, which constitute twenty per cent. of injuries, are frequently seriously complicated because of abscessed teeth, and we have a glimpse of the relationship of dentistry and medicine. Careful investigations by radiographic examination show that more than fifty per cent. of persons of draft age have chronic suppurating foci in the jaw bones. Add to this the thousands of cases of "trench mouth" in which the gums are so swollen and painful that food cannot be chewed, a condition requiring the most careful dental service; also the many cases of fractured jaws which the trained dentist is peculiarly well qualified to treat. Will any one say that in army service, the nose and throat specialist, the eye and ear specialist or many other of the specialists are more important than the dentist?

In conclusion, attention is called to the fact that the members of the class of 1918 will be able to finish their dental training and be ready to enter the army dental service at as early a date as their training could be completed for line service, and the class of 1919 could be made ready for graduation by January 1st of that year. All dental schools will modify their courses to give special training for army service, so that the graduates of next year will be in some ways better qualified than dentists who have been in regular practice for some years.

In presenting this statement, it hardly seems necessary that we should pledge the fullest possible degree of loyalty of the dental profession and its schools to the government. We believe it our highest duty to see to it, if we can, that the dental needs of the army, and of the civilian population be cared for in the best manner possible. This is our aim.

All of which is respectfully submitted.

HENRY W. MORGAN, Nashville, Tenn.
H. E. FRIESELL, Pittsburgh, Pa.
W. H. G. LOGAN, Chicago, Ill.
F. M. CASTO, Cleveland, Ohio.
ARTHUR D. BLACK, Chairman,
122 So. Michigan Ave., Chicago.

Banana Flour Substitute for Wheat Flour

(Consul Henry D. Baker, Trinidad, British West Indies, May 23)

The Horticultural Club of Trinidad has arranged to have loaves of bread baked from banana flour, prepared at local bakeries and offered for public sale in order that the people may have an opportunity to know that a most palatable bread can be made from banana flour.

At a recent meeting of this club, samples of banana flour and bread were exhibited and the method of preparation described. It was explained that the bananas from which the flour and bread were made had been taken from trees only five days previously, the "silk fig" small variety of bananas producing the best results.

The process was described as follows: Full-grown green bananas should be selected. Peel, slice and dry quickly, preferably on a galvanized sheet, then grind in ordinary corn mill. From 63 pounds of green bananas, 16½ pounds of flour had been obtained in the specimens shown. The bread, which was very palatable, had been made from two parts of banana flour and one part of wheat flour. The banana flour could also be used as a substitute for oatmeal porridge and also for making puddings.

Reckoning the cost of the bananas used in the above experiment at thirty cents, and the labor for preparing into flour at twenty cents, it had cost fifty cents, equal to about three cents per pound. The *London Lancet* was quoted as stating that banana flour is more digestible and contains more nitrogenous matter than wheat flour; also it could keep for a considerable length of time.

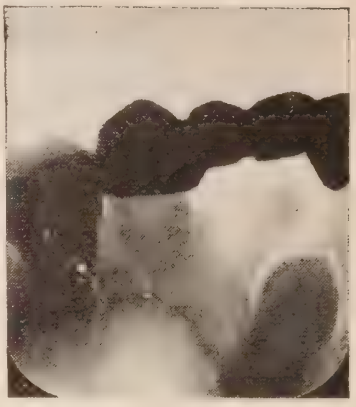
It was also stated at the meeting that plantains could be made into flour in the same manner, and such flour was very nourishing for children. Reference was made to the fact that such flour was exported from British Guiana, and was known as "bannanine."

ORAL SURGERY
CASE REPORTS

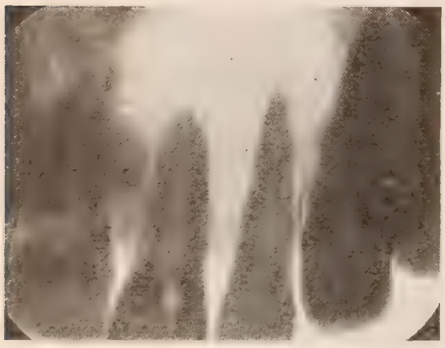
CONDUCTED BY HUGH W. MacMILLAN, D. D. S., CINCINNATI, OHIO

THIS DEPARTMENT AIMS TO REPORT INTERESTING ORAL SURGERY CASES IN BRIEF FORM, ILLUSTRATED BY RADIOGRAPHS AND PHOTOGRAPHS WHERE POSSIBLE. ARTICLES FOR THIS DEPARTMENT MUST NOT BE MORE THAN 500 WORDS IN LENGTH. SEND CONTRIBUTIONS TO DR. HUGH W. MACMILLAN, UNION CENTRAL BUILDING, CINCINNATI, OHIO.

Case VI: Miss M. H., age 30, presented suffering from neuralgia, chiefly in the infraorbital region on the right side. She had worn a bridge from the upper right lateral to the second bicuspid for several years. She could give no history as to the extraction of the cuspid. The tissues around the bridge appeared normal. The radiograph showed an impacted cuspid and a supernumerary tooth. These were removed under conductive anesthesia. The neuralgia immediately disappeared and the wound healed normally.



Case VI—Fig. 1



Case VII—Fig. 1

Case VII: Mr. F., age 27, presented with lip and labial gum over the superior right central swollen. Pus exuded from a fistulous opening of long standing over the apex of the central. There was a history of a blow on the central when a boy. A radiograph was taken as shown in *Fig. 1.* Under a general anesthetic the central and the lateral were removed; also the necrotic septum. There was a large amount of pus, the pocket of which extended palatally two inches from the gingival margin and nearly one inch in width. The palatal bone was carious. Having established free drainage the case was irrigated with Daken's solution and normal saline solution and granulations are rapidly taking place.

Case VIII: Mr. M., was referred by his dentist for the removal of a totally impacted lower right third molar. The patient was suffering from neuralgia. The lower molars on that side were sore; patient anemic. The general mouth conditions were filthy, although the soft tissue area around the impaction was apparently healthy. The tooth was removed under conductive anesthesia, with little post-operative pain. After forty-eight hours the patient developed a temperature of one hundred degrees, and secondary hemorrhage which ordinary methods failed to control, but which was finally stopped after a period of some hours by injections of horse serum. Symptoms of sepsis developed rapidly, with temperature running to one hundred and three degrees. Intraoral drainage could not be established, as there was a pronounced temporary ankylosis. Free drainage was made by opening externally through the cheek from the lower border of the jaw near the angle.

During the next week it was found necessary to remove the first and second molars and the bicuspids. A Wassermann was then made and showed positive. The patient was immediately placed under specific treatment and began to improve. Several large sequestra have been removed and the case is now clearing up, although recovery is sluggish. Daken's solution and normal saline have been used for irrigation. The patient is now rapidly regaining weight.

Case reports by F. W. Rounds, Exodontist, Louisville, Ky.

718 Stark Building.

Examples of a Dietary that Will Not Produce Caries, and One that Will

We may illustrate the two different types of diet which are often more or less consistently followed, by the following dietaries:

First we shall refer to the kind of meal which does not produce caries:

Breakfast—Fish, bacon, toast and butter, fruit, coffee and tea. (For children, milk, water.)

Luncheon—Meat or poultry, potatoes, salad, baked bread, pudding, fresh fruit, water.

Supper—Rusks, toast or bread rolls and butter, chicken or fish, an apple, tea or coffee. (For children, water, milk.)

Secondly we may outline the kind of meal which induces dental caries:

Breakfast—Porridge and milk, bread and marmalade. Then perhaps a supplementary breakfast a few hours after of a glass of milk and a sweet biscuit.

Luncheon—Mashed potatoes and gravy, or minced meat, milk and pudding.

Supper—Bread, soaked in milk or bread and jam, cocoa and cake, and a supplementary supper on going to bed of a glass of milk and a biscuit or just a "tiny piece of chocolate."

On comparing these two different types of diet, we observe that one is of a kind which stimulates mastication and the last thing taken leaves the mouth clean, or at least free from carbohydrates, so that even when soft food is part of the meal, the mouth will be physiologically clean at the end of the meal. The other type is intended to represent the kind of meal which is calculated to lodge about the teeth, and to ruin them within a few years by making efficient mastication and the self-cleansing of the mouth practically impossible, and by leaving the mouth sticky with fermentable carbohydrates and a virulent crop of acid-forming micro-organisms which have had their development encouraged by the previous meal.

—*Dr. A. W. Crosby, Dental Cosmos.*

SOCIETY·ANNOUNCEMENTS

Indiana State Board of Dental Examiners

Next meeting of the Indiana State Board of Dental Examiners will be held at the State House, Indianapolis, November 12-17, inclusive. Applications and other information may be obtained by addressing H. C. McKittrick, Secretary, Indianapolis.

Michigan State Board

The next session of the Michigan State Board of Dental Examiners for the examination of candidates wishing to practice dentistry in the state of Michigan will be held in the city of Ann Arbor (Dental College Building), the week of November 5th to 10th, inclusive. Applications should be made early as all preliminaries must be complete and in the hands of the secretary not less than ten days prior to the examination. Photographs and itemized preliminary educational qualifications required of all candidates.

For all further information address, E. O. GILLESPIE, *Secy.-Treas.*,
Stephenson, Mich.

Texas State Board

The Texas State Board of Dental Examiners will hold its next examination in Dallas, Texas, beginning Monday, December 17, 1917. No diplomas exchanged, no reciprocity. All applications accompanied by the fee of $25.00 should be in the hands of the secretary no later than December 12th. For further particulars and application blanks, address,

HARRISON B. CAVE, *Secy.*,
810-14 Wilson Bldg., Dallas, Texas.

Pennsylvania State Board

The next examination of the Pennsylvania Board of Dental Examiners will be held in Musical Fund Hall, 808 Locust street, Philadelphia, and the University of Pittsburgh, on Tuesday, Wednesday, Thursday and Friday, December 4, 5, 6 and 7, 1917. The examination in operative dentistry will be held on Tuesday, December 4th, at 8:30 o'clock, in the Philadelphia Dental College, 18th and Buttonwood streets, Philadelphia, and the University of Pittsburgh Dental Building, Pittsburgh; prosthetic dentistry, Tuesday, 1:30. Application papers can be secured from the department of Public Instruction, Harrisburg. For further information address,

ALEXANDER H. REYNOLDS, *Secy.*,
4630 Chester Ave., Philadelphia, Pa.

Colorado State Board

The Board of Dental Examiners of the state of Colorado will meet in Denver, Colo., Tuesday, December 4th, 1917, at 8:00 A.M., for examination of applicants for license to practice dentistry in the state of Colorado.

In addition to the written examinations, applicants must supply their own patients, instruments and materials, and come prepared to do practical work under the supervision of the Board. All applications must be in the hands of the secretary not later than December 1. For application blanks and information, address R. C. QUICK, *Secy.*,
310 Metropolitan Bldg., Denver, Colo.

Psi Omega Fraternity

All members of Psi Omega attending the National Dental Association will find headquarters provided at the Hotel Astor during the week of the convention. *Please register immediately upon arrival.*

The annual meeting and banquet of the fraternity will be held at the Hotel Astor, Friday evening. October 26th, 1917.

H. M. POTTER, *Secy. Reception Com.*

National Association of Dental Faculties

The 1917 meeting of the N. A. D. F. will be held at the Astor Hotel, New York City, Friday and Saturday, October 19 and 20, 1917.

Executive committee will meet at nine o'clock A. M., and the general session will open at ten o'clock as usual.

CHAS. CHANNING ALLEN. D.D.S.. *Secy.*
N.W. corner 10th and Troost, Kansas City, Mo.

A Warning

The following letter sent to secretaries of state dental societies is self-explanatory and important:

"It has been brought to the notice of the government at Washington that men within the conscription age have made application to dentists to have teeth extracted to the extent of incapacitating them for military service. Orders have been issued to the state and local societies to inform the members that such cases are to be immediately reported to Dr. T. A. Broadbent, 25 E. Washington Street, secretary of Chicago Dental Society, giving name and address if possible of such persons.

"It is also demanded that men within the conscription age who have teeth extracted be prepared to produce the extracted teeth on request of the exemption board.

"Dentists who are guilty of extracting for this purpose will be prosecuted to the fullest extent by the Federal Government.

"Notify your members immediately upon receipt of this letter."

Fraternally yours,
T. A. BROADBENT, *Secretary,*
Chicago Dental Society.

NATIONAL DENTAL ASSOCIATION ANNOUNCEMENTS

Transportation Arrangements to 21st Annual Session, New York, N.Y., Oct. 22-26, 1917.

Those who are going to New York for the National Dental Association meeting, October 22nd to 26th, are urged to consult the local ticket agent at their home town for complete information regarding fares, time limits and stop-over privileges in connection with the trip. There is on file in every ticket office the tariff schedule which officially informs local agents of the rates from that point.

From various points in the United States, passenger associations have announced special rates as follows:

Central Passenger Association: This comprises the territory of the lower peninsula of the State of Michigan. All territory as far south as the Ohio River, as far east as Buffalo and Pittsburgh, and as far west as a direct line drawn between St. Louis and Chicago. Two cents per mile in each direction. Signature form of tickets will be sold October 19th, 20th and 21st, final return limit to reach the original starting point not later than midnight, October 30th. A joint tariff authorizing fares for the annual session of the association from points in the Central Passenger Association territory has been compiled. .

For your information, I am giving you herewith round-trip rates authorized for our meeting from the principal points in the Central Passenger Association territory to New York and return:

Battle Creek, Mich.	$29.25	Indianapolis, Ind.	$32.50
Bay City, Mich.	28.00	Jackson, Mich.	27.45
Chicago, Ill.	36.30	Kalamazoo, Mich.	30.15
Cincinnati, Ohio	30.10	Saginaw, Mich.	27.50
Cleveland, Ohio	22.90	South Bend, Ind.	32.10
Columbus, Ohio	25.30	Springfield, Ohio	27.10
Dayton, Ohio	28.10	St. Louis, Mo.	42.20
Detroit, Mich.	26.50	Terre Haute, Ind.	35.40
Grand Rapids, Mich.	30.55	Toledo, Ohio	26.50

The Trunk Line Association: This serves most of New York, Pennsylvania, New Jersey, Delaware, Maryland and West Virginia, also a part of Virginia, and announces that there will be available for those attending the coming session of the National Dental Association, a railroad rate of two cents per mile in each direction with a minimum of $1.00 for the round trip on the certificate plan, going and returning via same route only. Going tickets in connection with certificates to be sold October 19th, 20th and 21st at one-way fares applicable to New York City on the certificate plan. These certificates must be obtained from the Ticket Agent at the starting point, and to be valid for the reduced fares returning, must be endorsed by the secretary of the National Dental Association, indicating that the holder has been in attendance at the meeting and is entitled to the reduction, and must also be validated by a special agent on either October 24th, 25th or 26th. Return tickets will be sold on presentation of validated certificates October 24th-29th at the difference between the fares paid on the going trip and the fares for the round trip; these latter tickets to be limited to continuous passage to destination, which must be reached in no case later than October 30th.

New England Passenger Association: Two cents per mile in each direction, short line mileage, going and returning via same route, and that one over which one-way tickets are regularly sold, and only from points where regular one-way fare to New York City is over $1.00. Tickets to be sold or certificates issued and good going October 19th, 20th and 21st, and returning to reach original starting point not later than midnight of October 30th.

Trans-Continental Passenger Association: Summer rate tickets from North Pacific Coast points may be purchased as late as September 29th, return limit October 31st.

Chicago and return	$ 80.00
St. Louis and return	77.50
New York and return	118.20

Regular nine months excursion fares, approximating two cents per mile in each direction, are in effect daily from California and North Pacific Coast points.

From California to Chicago and return	$110.00
From California to St. Louis and return	103.00
From North Pacific points, Chicago and return	109.00
From North Pacific points, St. Louis and return	103.50

Western Passenger Association and Southwestern Passenger Association: To members located in this Association, which comprises practically all the territory west, northwest and southwest of Chicago, wish to advise that no special rates have been announced, and you should therefore consult your local Ticket Agent regarding fares from your home city, and where possible to do so, arrange to purchase your tickets through unless you find that by purchasing tickets from your home town to St. Louis or Chicago, that you can then re-purchase, taking advantage of the special rates from these points as shown in previous paragraph to New York City and return.

SPECIAL TRAIN FROM CHICAGO

For the accommodation of those going to the National Dental Association meeting to be held in New York, October 22-26, 1917, arrangements have been made with the Michigan Central Railroad to operate the "National Dental Association Special," leaving Chicago from the Michigan Central Station, 12th street and Michigan avenue, at 5:40 P.M., Saturday, October 20th. This will be an all Pullman train consisting of club car, compartment car, standard sleepers, observation car and dining cars. The train will make intermediate stops on the Michigan Central at Kalamazoo, Mich., at 8:52 P.M., Battle Creek at 9:26 P.M., Jackson, Mich., at 10:24 P.M., Ann Arbor, Mich., at 11:14 P.M., and Detroit, Mich., at 12:01 midnight, and is scheduled to arrive in Niagara Falls at 7:25 A.M., Sunday, October 21st, where our train will be parked so that we may occupy our cars at any time during the day. The entire day may be spent visiting the various points of interest at Niagara Falls.

The Pullman fares from Chicago to New York, including the occupancy of our cars if desired at Niagara Falls, are $6.00 for lower berth, $4.80 for upper berth, $17.00 for compartment, and $21.00 for drawing room.

Arrangements will be made with one of the principal hotels at Niagara Falls to serve breakfast. The special train will leave Niagara Falls at 7:20 P.M., Sunday, October 21st, and will arrive in New York, 7:50 A.M., Monday, October 22nd, in ample time for the opening of our convention.

When purchasing your tickets, make sure that they read East of Chicago via the Michigan Central to Buffalo, N. Y. C. to New York. Account fast time, an excess fare of $5.00 will be charged on all tickets reading from Chicago to New York on this train, but to those stopping over at Niagara Falls, this excess will be refunded on presentation of tickets to the Depot Ticket Agents at Niagara Falls.

For detailed information, consult any agent of the Michigan Central Railroad, or write to Mr. Fred. E. Deal, City Passenger Agent, Michigan Central Railroad, 228 So. Clark street, Chicago.

Let us get together this year and make this the best convention ever held by our association, and also try as far as possible to travel on the special train as outlined above.

Committee on Transportation,
D. C. Bacon, *Chairman.*

SUGGESTIONS

CONDUCTED BY F. R. CHAPMAN, M.S., D.D.S., COMUMBUS, OHIO

(To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Bldg., Columbus, Ohio.)

A Convenient Method of Softening Rubber for Packing

Stretch a piece of towelling over the top of an enameled basin; the water in the basin is kept boiling by a Bunsen burner beneath it, and the steam passing through the towel softens the rubber without allowing it to stick to the towel.—*C. A. Kennedy, Oral Health.*

Winding Cotton Wisps

When the writer began to use smooth, round bristles, he at once found it impossible to wind cotton upon these satisfactorily. Fortunately, an inspiration came to him which solved the problem. A small metal box 2¼″x1⅜″x¼″ deep, filled with sheet wax, is conveniently placed at hand. The smooth bristle is drawn lengthwise over the wax, while it is lightly pressed down with the ball of the middle finger of the left hand. This covers about one-half the surface of the bristle with the merest film of wax, whereupon the winding of the cotton shred upon it becomes play. The surface of the wax can be sterilized by passing it over a blue flame, or preferably with the blow pipe.—*C. Edmund Kells, Dental Items of Interest.*

Don't say "job" in reference to your work. Job means a petty piece of work undertaken for a specified price. Job is worse than trade. Job suggests half soling shoes, 50 cents; hair cut, 35 cents; hinge on gate, 30 cents.—*Editorial, Nebraska Dental Journal.*

"Consider the Source"

When you hear a man make a statement, or read it in a journal, don't accept it as gospel because that man makes it; submit it to the ordeal of investigation by your own common sense. Ask yourself a few questions about him. Does he do good work? Does he believe his own statement? Does he get good results? Is he reputed to get good results? Has he had sufficient experience to enable him to draw conclusions as to the subject under discussion? Is he sanguine or pessimistic? Does he play to the gallery? Is he in the habit of rushing into print, or does he wait until he feels sure of his premises? Does he usually display common sense? Those are just a few of the questions you can ask yourself. In many cases your own common sense will suggest others.

—*Fairfax Reading, Commonwealth Dental Review.*

Hypersensitive Cavities where a Non-conductive Lining is Indicated

Blotting paper or asbestos medicated with carbolic, creosote, etc., and seated in, will, in many cases, prevent shock from thermal changes.

—L. R. Moore, Commonwealth Dental Review.

Preserving the Pulp

One of the greatest drawbacks I think in the adjustment of bridges has been the apparent necessity of devitalizing tooth pulps. The saving of pulps is the greatest problem before the dentists of the world today—to care for teeth from early infancy up to adult life and extreme old age so as to preserve the vitality of the tooth pulp, avoid pericementitis and the formation of dental abscess. If that can be done, it will put an end to a great amount of trouble we are contending with today. If that were done a great many medical men who claim the teeth are responsible for all diseases that they cannot otherwise account for, would be obliged to make some other explanation to patients.—*T. W. Brophy, Dental Review.*

Gold or Aluminum Lining for Vulcanite Dentures

When the wax base plate has been removed from mold just before packing in the rubber, coat model with liquid silex and immediately sift on some powdered aluminum or powdered gold as you may desire. Now dissolve a piece of same kind of rubber used for plate in chloroform and add double the amount of powdered aluminum to the bulk of the solution and by means of a camel's hair brush coat the model with same. Allow sufficient time for the chloroform to evaporate before packing rubber and closing flask.

A lining prepared in this way is durable and cannot possibly pull off. The lining prevents any action of silex on the plate in vulcanizing, and the silex prevents the plaster from sticking to the palatal portion of the plate.

—T. W. Crozier, Dental Register.

Ambrine

Ambrine is a French secret preparation that has been on the market for many years. It has recently come into prominence through sensational articles in the lay press. For all practical purposes it is solid paraffin to which some material has been added to make it adhesive and more plastic. For use it is heated until liquid and then applied to open wounds and burns, forming a relatively impervious dressing.

—Jour. A. M. A., per Ohio State Medical Journal.

To Relieve Pain in Socket After Extraction

Dip a small piece of wool into pure chloroform and oil of clove and place in cavity; relief will be given in a few seconds.—*Oral Health.*

Thymol

Experiments show that a saturated aqueous solution of thymol is a very good antiseptic for ordinary mouth bacteria, and it is the most satisfactory mouth wash that I have been able to find. In cases kept under observation (some for more than a year) in which this solution has been used at least every night, the growth of leptothrix, as well as the bacteria which can easily be cultivated artificially, has been very much diminished, so that there is practically no accumulation of tartar. In cases of pyorrhea where the gums are too sore for even a soft brush to be used, they should be massaged with the fingers, and then well washed with the solution, some of which should be retained in contact with the gums for some minutes. An antiseptic solution is much to be preferred to a paste or powder. The saturated solution of thymol has a pleasant taste, causing a temporary burning sensation, and stimulating a flow of saliva. It is a stronger antiseptic, and less irritating, than carbolic acid, to which it is closely related, being also a monohydric phenol (monohydroxy-cymene or paramethylisopropylphenol). It is not acid, and is free from the corrosive action of phenol. It may be used as a gargle as well as a mouth wash, since it is harmless if swallowed—large doses being sometimes given as an intestinal antiseptic.

—Helen P. Goodrich, Commonwealth Dental Review.

Accurate Crown Band Measurements

These measurements must be as accurate as our technic will permit. For this reason any wire that has a diameter to speak of will increase the length of the band by twice the diameter of the wire used. As an aid to accuracy I have found the use of a strand taken from fine picture wire best suited for the purpose. It is tough, does not stretch and can be obtained in any locality. When the picture wire or rope has been cut to length, such as we usually need, the many strands can be easily separated.

—F. W. Frahm, Pacific Dental Gazette.

Inlay Gold

I use coin gold exclusively. Two and a half dollar gold pieces in all my Taggart inlays. It is standard and can be depended on to have the alloy a constant and well mixed blend, and the copper in coin gold makes it an ideal gold to resist mastication, as well as to hold a high burnish indefinitely. It is easy to cut in pieces, if you use the "two and a half pieces." They are very thin.—*Homer Almon, Dental Review.*

To Preserve the Steel Needle

Dip the steel needle in melted vaseline before placing in a solution of alcohol and glycerine.—*F. H. Welden, Nebraska Dental Journal.*

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

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The Ohio State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
Iowa State Dental Society
Texas State Dental Society
Tennessee State Dental Society
Section on Stomatology—American Medical Association
Interstate Association of Anesthetists
and Several Local Dental Societies

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L. P. Bethel, M.D., D.D.S., Editor-in-Chief

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REGULAR CONTRIBUTIONS

IMPRESSIONS FOR FULL DENTURES, PRINCIPLES AND A TECHNIC*

BY GEORGE H. WILSON, D.D.S., CLEVELAND, OHIO

IMPRESSION DEFINED: An impression is a negative likeness of an object or part taken in a plastic material, from which a cast or positive likeness may be produced.

When the prosthetist determines to construct a base-plate artificial denture, he at once decides upon its general form and extent of surface to be covered with the base-plate. He also forms a tentative plan for retaining the artificial denture. A definite scheme must be in mind before taking the impression, because an impression suitable for the contemplated appliance should be obtained. This statement is made to impress the fact that an impression is not necessarily an *exact* negative likeness of a part; but it must be perfect in its suitableness for the work in hand. The soft tissue is the factor that creates the variableness in impressions. Rarely is an impression perfect for its intended use unless the soft tissues are, to a certain extent, distorted. Nevertheless, this distortion must be suitable for its intended purpose.

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*Read before the Northern Ohio Dental Society, June 1917.

The impression should extend a little farther than the contemplated base-plate, but any excessive extension causes unnecessary discomfort to the patient, and indicates indifference or thoughtlessness on the part of the prosthetist.

NEW SCHEME

Modern ideas of impression taking are undergoing a radical change, or rather, there is a radical change in the appreciation of some old ideas. The new appreciation is that *with full dentures as large a base-plate area as possible must be covered, that the periphery of the denture must extend upon yieldable tissue sufficient to form a valve-like contact, and that there must be contact with the entire area covered by the base-plate.*

BASE-PLANE

The base-plane is the area or plane surface upon which a base-plate theoretically rests. There are two extreme positions of the base-plane. Naturally all base-planes must be between the extremes, and classed with the extreme which best serves the specific case for retention and esthetics. The two conditions that determine the two extremes are the *excessively prominent alveolar process* and the *excessively resorbed alveolar process. Fig. 1* represents the base-plane for the excessively prominent alveolar process as shown by the dotted line from crest to crest and indicated by the arrow points. The base-plane for the excessively resorbed process extends from muscle attachment to muscle attachment and is indicated by the upper dotted line.

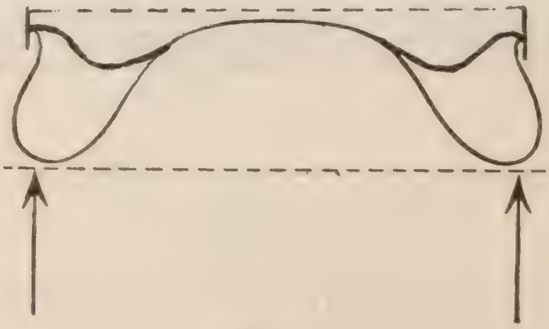

Fig. 1

The bearing of the base-plate is at the periphery of the base-plane; any extension beyond the base-plane is for retention and is an extension upon yieldable tissue to form a valve-like action, and is for the express purpose of shutting out air. Elaborate extensions may be necessary for esthetics.

AREAL CONTACT

Areal contact means contact over the whole area included within the periphery of the base-plane; but it does not mean uniform pressure over the whole surface of the base-plane. If the bearing is at the periphery of the base-plane, it will make no practical difference whether there is uniform pressure within the periphery, only so there is contact. If the bearing is at the periphery of the base-plane the artificial denture cannot rock; but if the bearing is at some distance within the periphery of the base-plane there will be rocking and insecure retention. The peripheral bearing desideratum can best be secured with a thin mix of plaster contained in a suitably-formed or reinforced tray.

FORMULARY FOR FULL UPPER OR LOWER IMPRESSIONS

First: Areal contact. *Second:* Peripheral bearing of the base-plane. *Third:* Extension upon yieldable tissue for retention.

Areal contact can only be assured by imbedding in a material that flows, that is neither flexible nor elastic. Thin mixed plaster best serves this purpose.

Peripheral bearing cannot be brought about by a thin mix of plaster, but can best be produced by a tray made for the case, or a brittania metal tray reinforced with pure yellow beeswax. The thin plaster simply assures contact. The wax secures the required compression over the desired portions of the impression and holds the soft tissues firmly and evenly against their bony foundation. This compression cannot be satisfactorily done by carving either the impression or cast.

Extension for retention is only necessary when the periphery of the base-plane is not supplied with yieldable tissue. For retention the labial and buccal flanges of the base-plate need only be high enough to exclude ingress of air; however, esthetics may require much extension of the flanges. The essential part of a base-plate to be extended onto yieldable tissue to get retention is the palatal border, from the external portion of one tuberosity to the external surface of the other. The palatal extension upon yieldable tissue should be one-eighth to one-fourth of an inch in width. The palatal extension for retention must hold the soft tissues firmly against its bone foundation, or it will act as a tickler and suggest nausea.

NAUSEA

The last statement implies that nausea is of the mind. It is, and its treatment is through the mind.

MUSCLE ATTACHMENTS

The principal muscles concerned in impression taking have their origin at the union of the alveolar processes, and the body of the jaws. The buccinator, the natural function of which is to control the bolus of food, has its origin on the maxilla and is inserted on the external oblique ridge of the mandible. The mylohyoid, one of the functions of which is to control the bolus of food, has its origin on the internal oblique (mylohyoid) ridge, with its insertion on the hyoid bone, a bone without osseous union, a floating bone; therefore, the remarkable influence of the mylohyoid muscle upon lower impressions and base-plates. The lines of these muscle attachments mark the periphery of the base-planes for the base plates in the class of excessively resorbed processes.

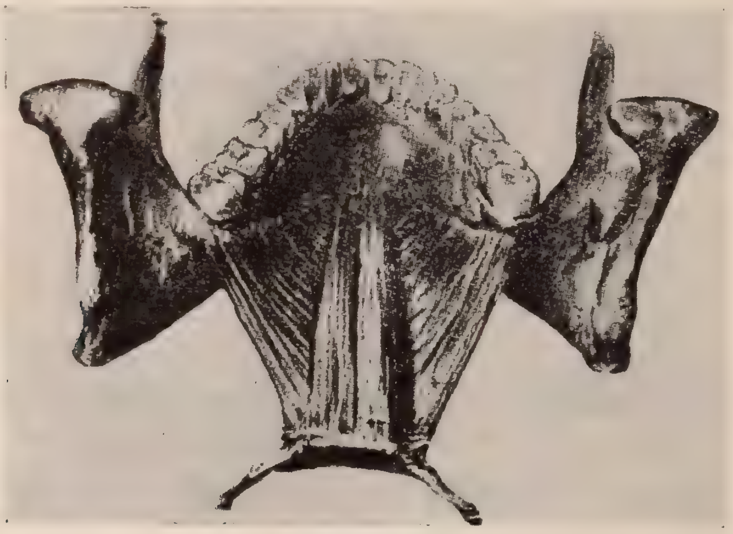

Fig. 2

Fig. 2: This illustration is taken from Blaire's "Oral Surgery," and gives a clear idea of the location and relation of the mylohyoid ridge of the mandible and the hyoid bone in a depressed position. It is easily imagined what effect the action of these muscles in elevating and protruding the tongue will have upon the lower base-plate, provided the lingual flange is too deep. Also, that when the alveolar process is excessively resorbed, so that the genial tubercles and mylohyoid ridge are on a level with the crest of the alveolar ridge, no descending lingual flange can be tolerated.

MASSETER

This muscle is often considered as a muscle to be reckoned with in impressions and base-plates. Indirectly it is, but not directly. Where there is a heavily-developed masseter its contraction upon over-extended disto-buccal flanges of the base-plate may cause severe laceration of the intervening soft tissues. In this case the disto-buccal angle of the base-plate must be removed sufficiently to give free action to the masseter.

FORM AND DIRECTION OF PLATE EXTENSION

Fig. 3 shows diagrammatic sections of the mandible and maxilla. Both show the dentures extending to the muscle attachments with extensions for retention. The direction for the extensions upon the lower denture is upward, and upon the upper denture the extension is downward. Extension in the direction of the dots is wrong and a source of irritation, although they can be manipulated so as to create great suction while the case may be on exhibition. The maxillary angle of the palatal border must be rounded enough so as not to cut, and yet maintain a close adaptation.

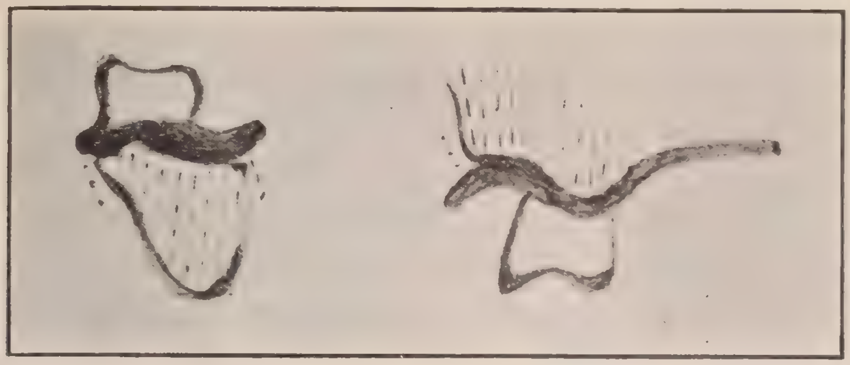

Fig. 3

RESULTS

A properly-taken impression cannot be intelligently discussed without at the same time giving some consideration to the principles of retention, for one of the motives of an impression is retention of the proposed denture. The results obtained should be a denture that is seated comfortably and lightly with no sense of suction; simply molecular or contact attraction. However, when a dislodging stress is applied a vacuum should be produced over a greater or lesser portion of the base-plane. This is possible because a portion of the vault of the mouth has a covering of thinner tissue and the two hard surfaces are easily separated. The molecular attraction between the yieldable tissue and denture is sufficient to cause the soft tissue to stretch a short distance, thereby creating a perfect vacuum over the tenser tissue, which will last until there is ingress of air or the stress is removed. Thus, a scientific result is obtained because the operation is based upon an appreciation of the anatomy and physics involved.

These principles and result may be easily demonstrated with an apparatus made of glass, velum and hard vulcanite. A sheet of heavy tin foil is placed upon a flat surface. A sheet of velum rubber, 2½ x 2½ inches, is smoothly centered upon the tin, a sheet of hard vulcanizable rubber, 2 x 2 inches, is centered upon the velum rubber, and a ½-inch screw with its head centered upon the hard vulcanizable rubber is bound in place with strips of hard vulcanizable rubber. The extending tin foil is turned over upon the rubber. The apparatus is flasked and vulcanized. The tin foil is stripped away and a handle attached to the screw. This apparatus will well represent a flat vault covered with thin tense tissue and yieldable tissue about the base-plane. A glass slab will represent an artificial denture. The slab is so large that it necessarily rests upon yieldable tissue upon the labial and buccal surfaces, but its palatal surface is placed so that it does not reach yieldable tissue, and there will be no retention. The slab representing the denture is extended one-fourth inch upon yieldable tissue, when excellent retention is secured until there is ingress of air. However, the patient returns and complains that it hurts and that she does not like the plate so far back in the mouth. The plate is cut off one-eighth inch, and still there is very good retention. The patient returns again complaining, and the plate is cut away just to the yieldable tissue. When the denture is returned to the mouth, the patient exclaims, "Why, Doctor! You have spoiled my plate; it was just fine before you cut it off and now you have spoiled it." Yes, doctor, you have spoiled it, because you should have seen that the case was one of the most difficult. The tissues are remarkably thin and tense; more than that, they are so dry and parched that they are glossy. An abnormal condition of the system, probably indicative of a serious chronic disease. The only justifiable means for successful retention of a full upper denture in such a case is palatal extension of one-fourth inch or more upon yieldable tissue.

Another case: This case is equally flat and has equally thin and tense tissues, but the patient is in excellent health and the fluids of the mouth are normal in quantity and quality. A denture is inserted that does not reach the yieldable tissue by one-fourth inch, but there is fair retention, for it resists two pounds of stress for several seconds. The denture is now extended one-fourth inch upon yieldable tissue and there is excellent retention.

These experiments illustrate the anatomy and physics involved in impressions and plate retention. They also demonstrate that there is a difference in retention in health and disease. Further, they demonstrate the virtue of areal contact, peripheral bearing of the base-plane, and extension upon yieldable tissue for retention.

TECHNIC

There are several technic systems for taking impressions. This paper is confined to a plaster method, which may be called areal contact and extension method. Another plaster method which is directly opposite to the one named, and which may be called contact without pressure method, is shown in *Fig. 4*.

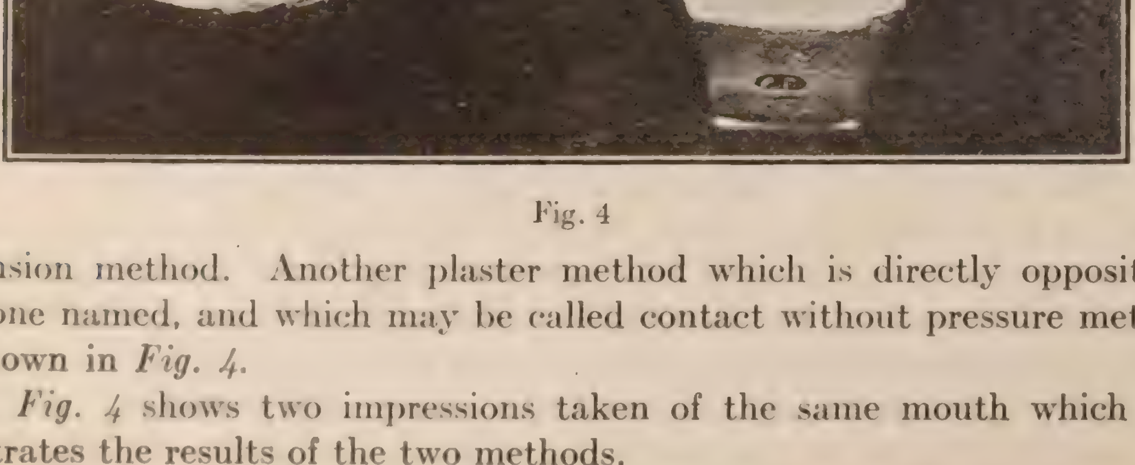

Fig. 4

Fig. 4 shows two impressions taken of the same mouth which well illustrates the results of the two methods.

This paper advocates and details the first method, that is, the impression shown at the right in *Fig. 4*. The technic can better be understood by illustrations than by word description.

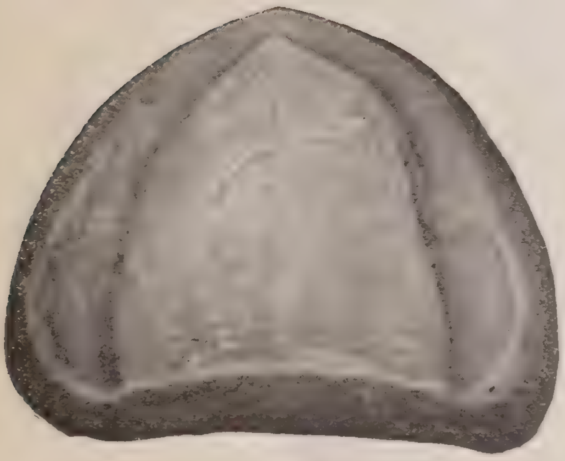

Fig. 5

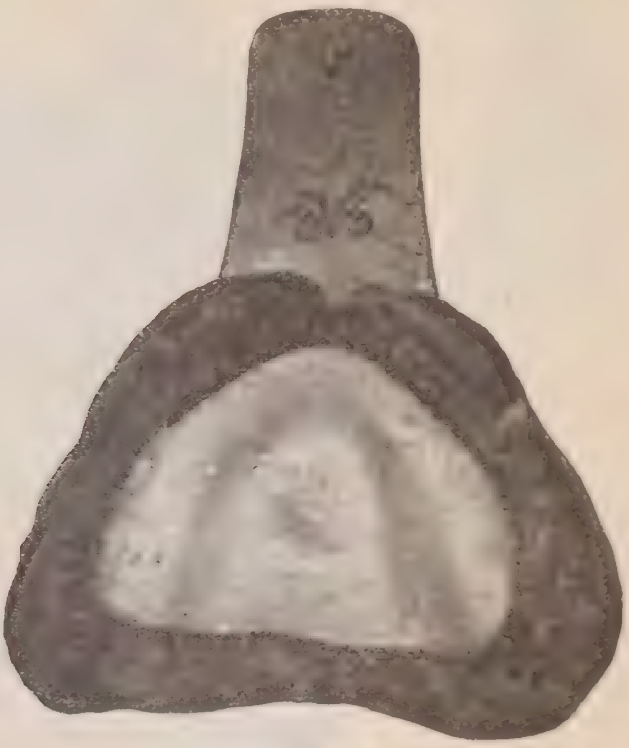

Fig. 6

Fig. 5 shows a cast of the excessively resorbed class, and *Fig. 6* a tray reinforced with yellow beeswax ready for the thin mix of plaster, for this case.

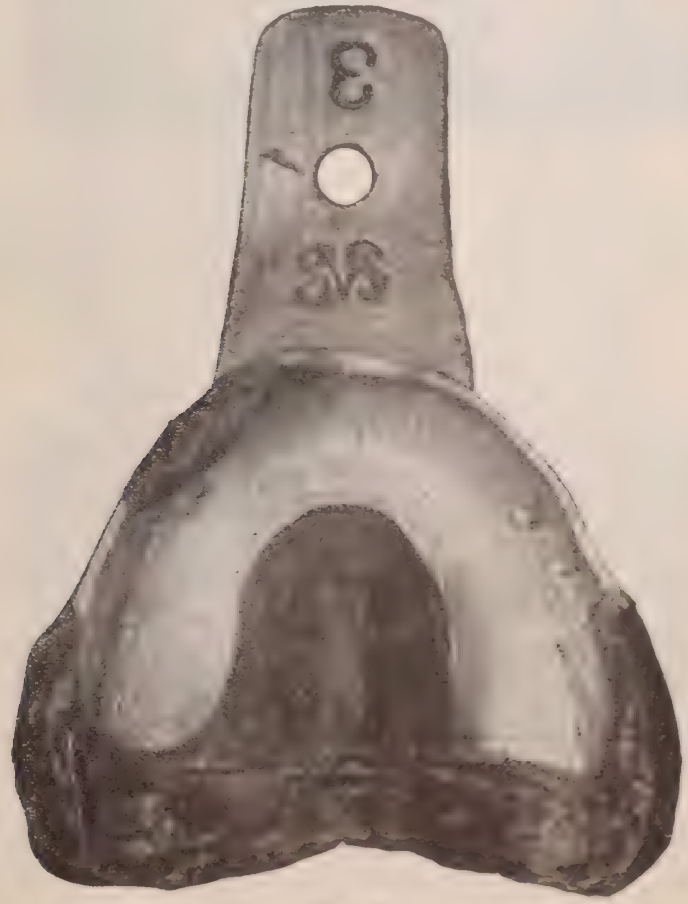

Fig. 7

Fig. 7 shows a tray reinforced to represent the method employed in the two following impressions of the excessively prominent class. The right side shows no cuspid (canine) eminence reinforcement; while the left side shows the reinforcement. This cut also illustrates the method of preparing the tray for a high vault.

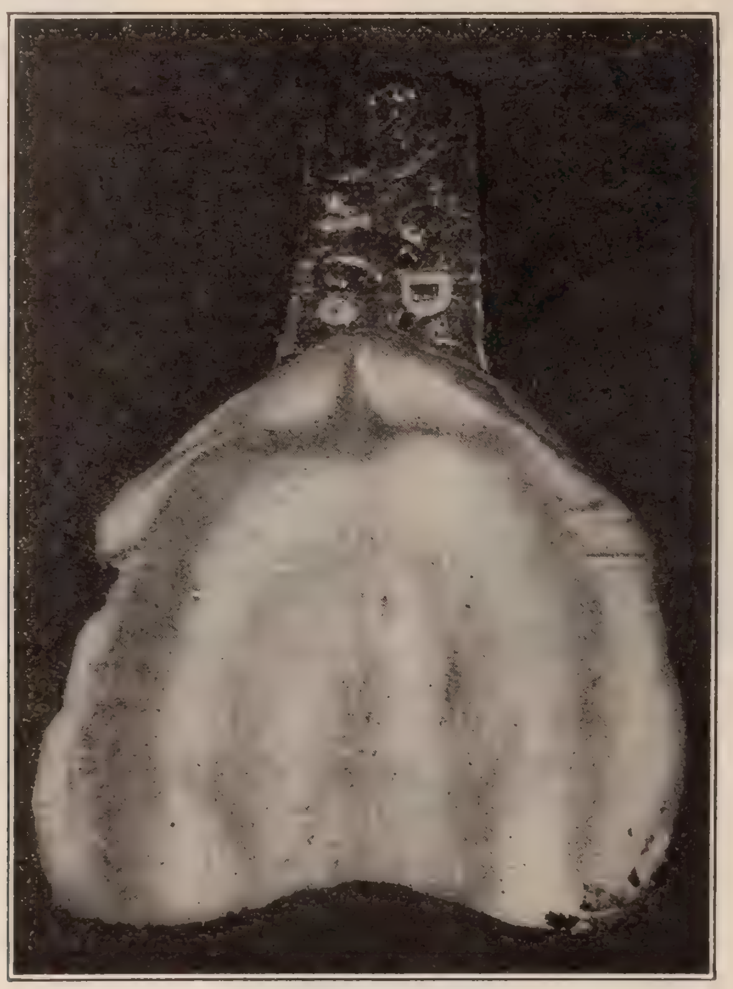

Fig. 8

Fig. 8 shows the excessively prominent process without cuspid reinforcement.

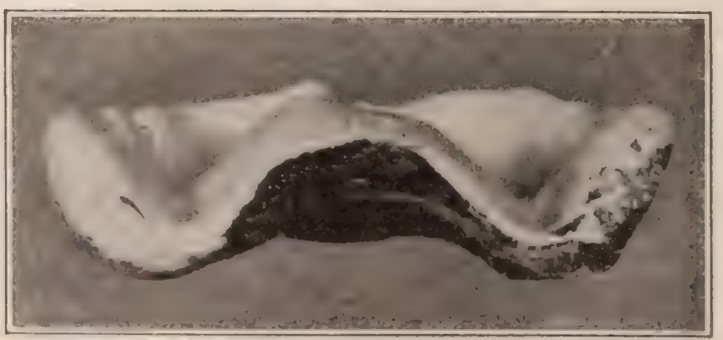

Fig. 9

Fig. 9 shows the palatal border of the same case.

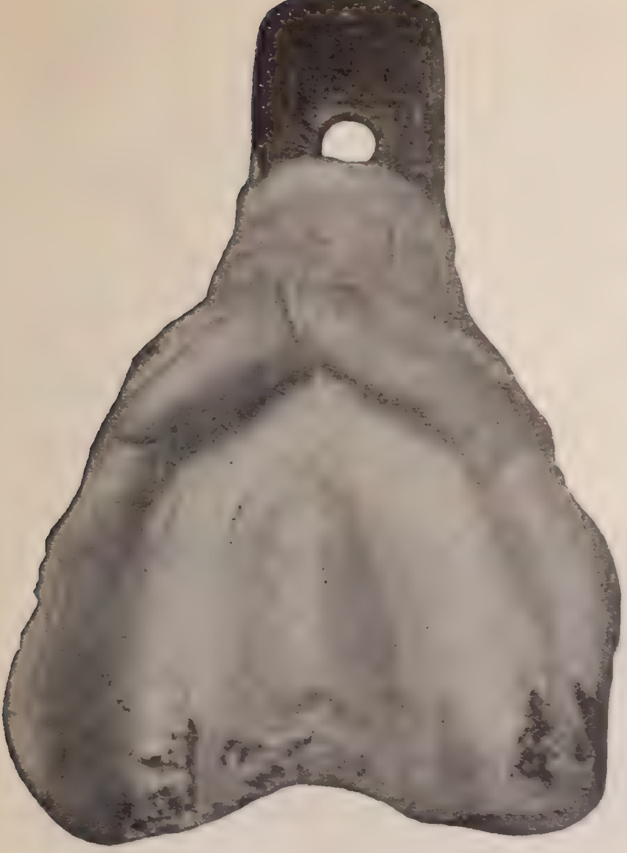

Fig. 10

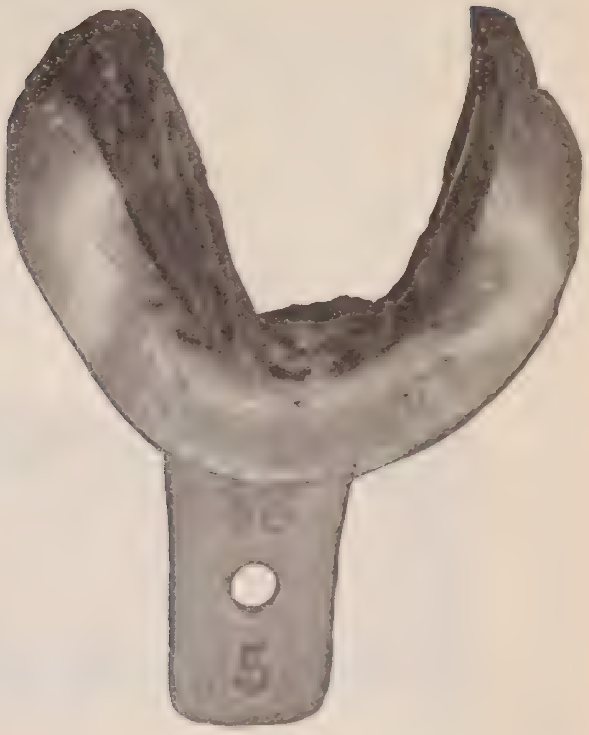

Fig. 11

Fig. 10 shows a prominent process with the cuspid wax restoration.

Fig. 11 shows the tray prepared with the lingual wax reinforcement for a resorbed mandibular process.

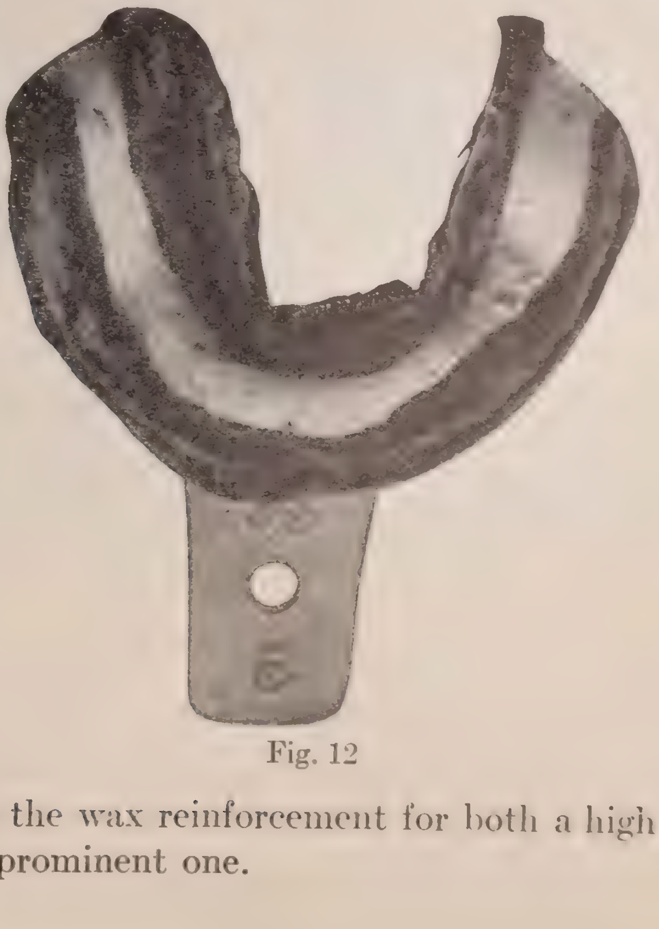

Fig. 12

Fig. 12 shows the wax reinforcement for both a high and thin process, also an excessively prominent one.

Figs. 5 to *12*, inclusive, were empirically taken, although they are excellent examples for a modern scientific impression. They were developed by experience as found necessary for esthetics.

The modern trend for impressions is to secure great retention. This trend is also empirical for the methods are usually not based upon the sciences. They are based upon a rule of thumb.

A science is classified knowledge, and a scientific impression must be based upon the sciences of anatomy, physics and esthetics.

The following *Figs. 13, 14* and *15* illustrate results of scientific impression taking. The black lines indicate the extent of the former dentures.

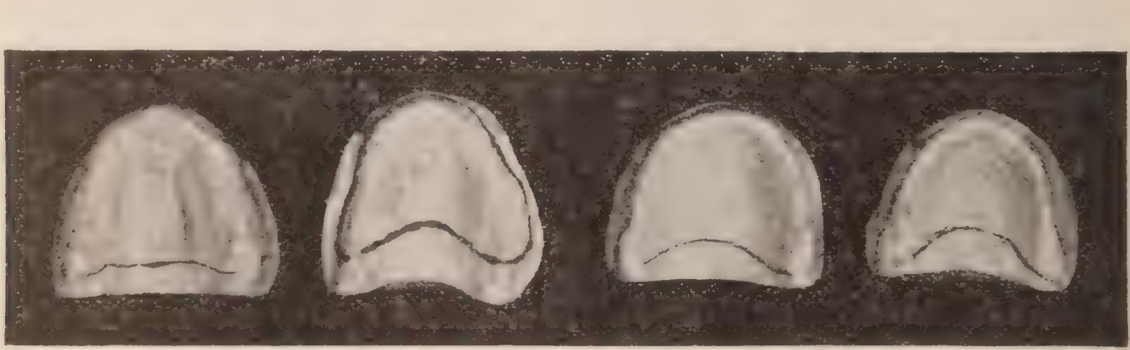

Fig. 13

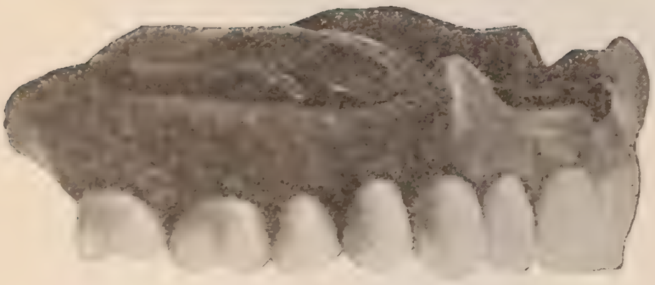

Fig. 14

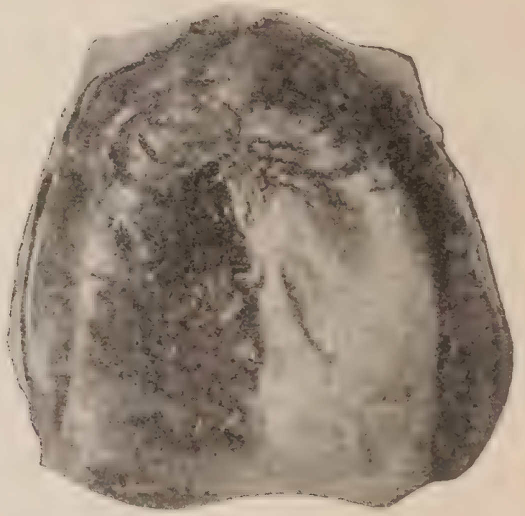

Fig. 15

CONCLUSION

A thin mix of plaster in a properly-reinforced tray, so as to secure areal contact, peripheral bearing of the base-plane and extension *as may be necessary,* is the scientific impression.

Memory is a good thing, if properly regulated. One should forget to remember some things and remember to forget a great many more.

—"*Modern Society.*"

A REPORT OF MANDIBULAR FRACTURES FROM PRACTICE —AND CONCLUSIONS FOLLOWING TREATMENT*

BY WILLIAM C. STILLSON, D.D.S., CLEVELAND, OHIO

BEFORE proceeding it should be clearly understood that the cases following have been handled along with a general practice of dentistry. Records have been kept of the cases as treated with the thought that they might be of interest to others doing a similar work, or that those expecting to take it up might profit by the errors made.

The opportunity of presenting this report is fully appreciated. The failures will be reported with the successes. It is hoped that it will be realized that this is simply an effort to "do a bit" for any who at any future time may have occasion to treat cases of a similar nature.

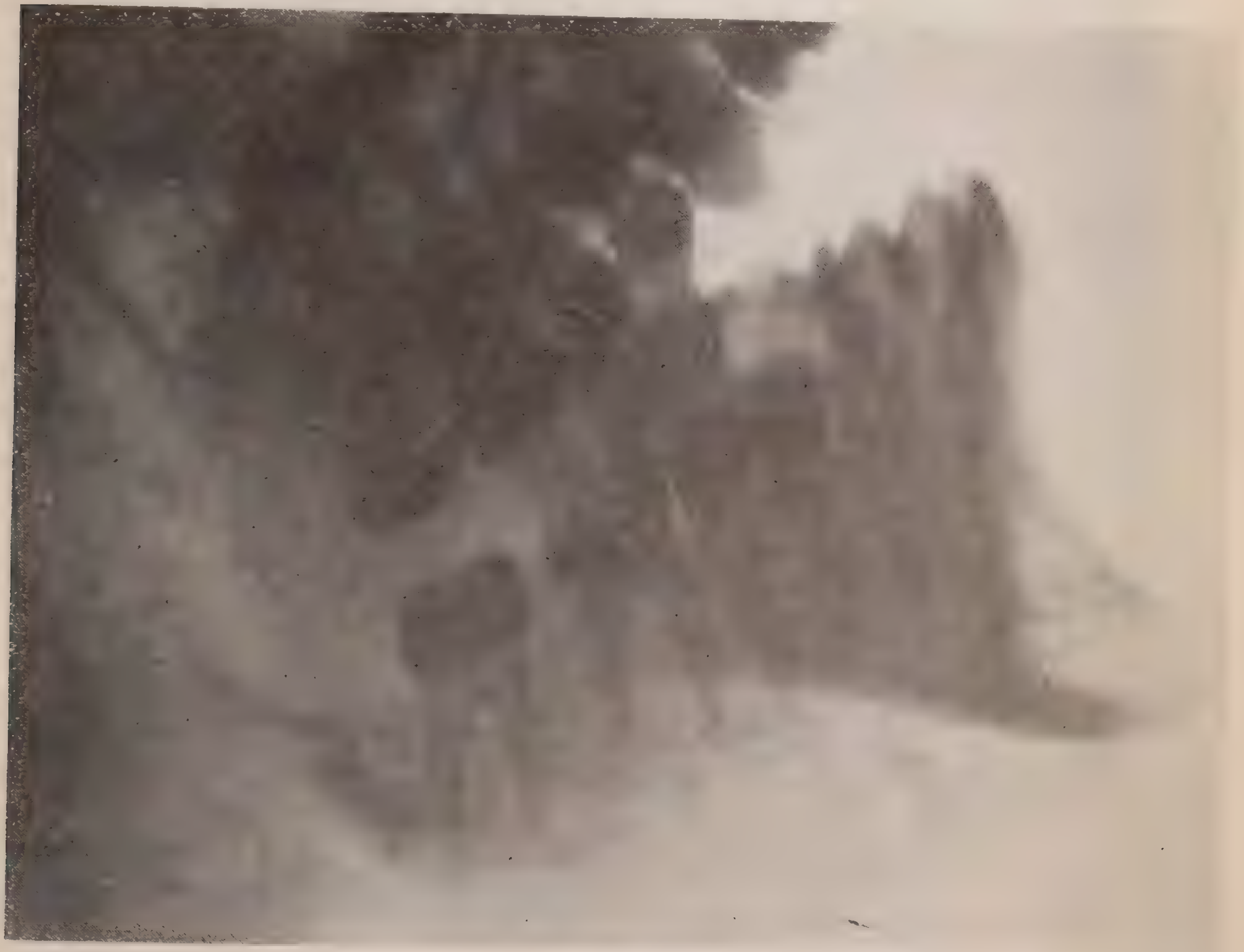

Fig. 1.

Fig. 1. (Case I)—Roentgenogram of fracture.

CASES—SIMPLE METHOD OF TREATMENT

Case I: Fracture occurred December 1st, 1915, the result of an automobile accident. *Fig. 1* is a Roentgenogram of the case, and it will take very careful inspection to locate the point of fracture. There was no loss of apposition of the bones and neither wiring nor splinting was necessary. The case did very well by placing two very small corks between the posterior teeth on both sides as a rest and a very light Barton bandage. In a few weeks the result was gratifying. The occlusion of the teeth was undoubtedly as good as before the fracture occurred.

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*Read before the Northern Ohio Dental Association, 1917; also before the Cleveland Unit of the Preparedness League of American Dentists.

ORTHODONTIC APPLIANCES

Case 2: Fracture was the result of an automobile accident, the patient a boy of eleven years. The date of the fracture was July 14, 1916. Line of fracture was between the lower right first and second bicuspids. *Fig. 2* is a Roentgenogram taken the day of the accident. *Fig. 3*, a photograph of the casts of the case superimposed, shows the line of fracture and lingual displacement of the right fragment. Impressions in this case were taken with modeling compound. Case was treated by using an ordinary Angle's expansion arch with molar clamp bands, the entire work being done in the mouth. *Fig. 4* is a photograph of the plaster cast of the lower teeth with expansion arch and bands in place. Small nuts upon the expansion arch both posterior and anterior to the tubes upon the bands made it possible to hold the case very firmly. The anterior teeth were wired to the expansion arch as illustrated in *Fig. 5*, which is a Roentgenogram of the case taken July 19, 1916, or five days after the fracture. An expansion arch was especially indicated in this case because of the nature of the fracture and the

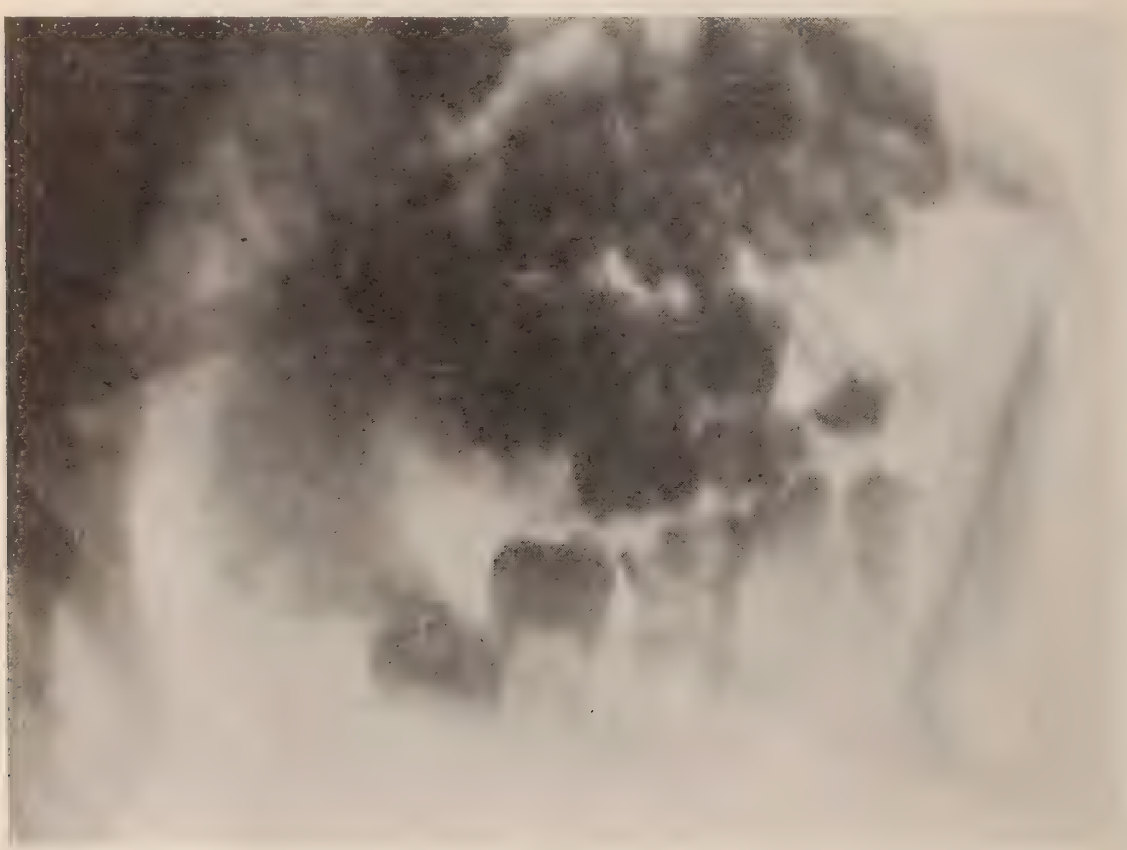

Fig. 2.

Fig. 2. (Case II)—Roentgenogram of fracture.

age of the patient. The lingual displacement of the right fragment was easily overcome by the use of the arch, and it was not necessary to wire the upper to the lower teeth. This, of course, made conditions favorable for better feeding of the patient. Two days after the accident the lower right first bicuspid, which was directly in the line of fracture, came out and after the orthodontic appliance had been placed upon the teeth an attempt was made to replace this tooth in the mouth, after cleansing with normal salt solution, by wiring to the expansion arch. It was felt at the time that the

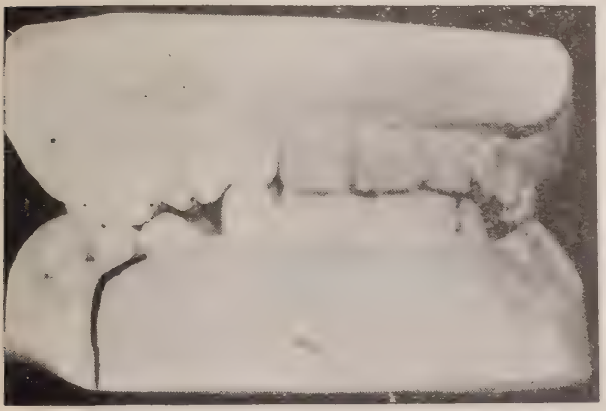

Fig. 3.

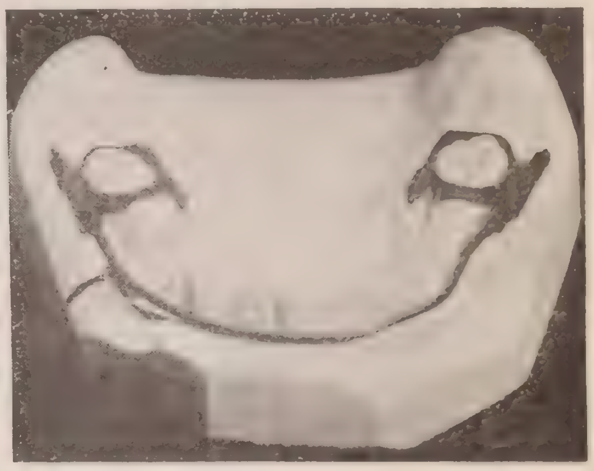

Fig. 4.

Fig. 3. (Case II)—Casts superimposed. Fracture between lower right first and second bicuspids.

Fig. 4. (Case II)—Orthodontic appliance used in treatment.

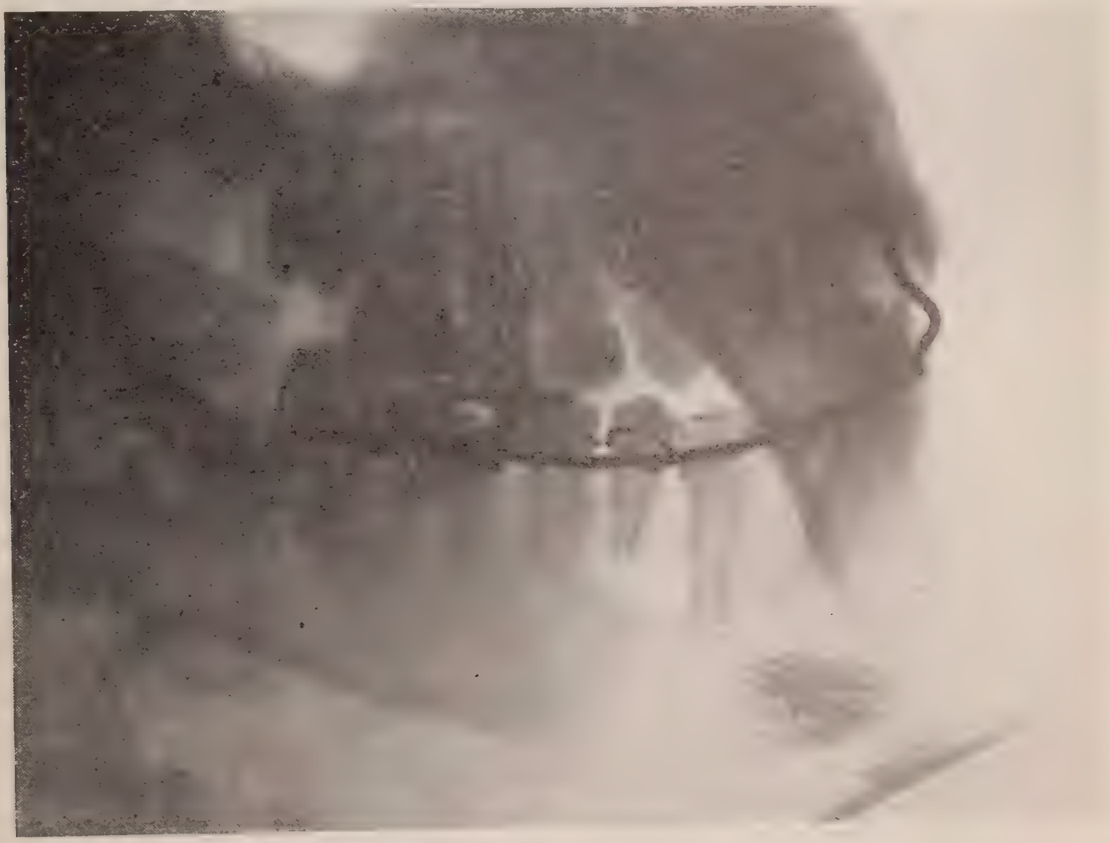

Fig. 5.

Fig. 5. (Case II)—Roentgenogram with splint in situ.

result was doubtful, and a few days later the tooth was removed. All appliances were removed from this case on August 30, 1916, about six weeks after the date of fracture. Results were very gratifying. It seems quite reasonable to believe that this simple method of treatment might be used in war dental surgery many times to very good advantage because the work may be done directly in the mouth.

Case III: Fracture occurred September 4, 1916, result of an automobile accident. *Fig. 6* is a Roentgenogram taken day of accident. *Fig. 7* a Roentgenogram of the case September 5, 1916, shows a little more clearly the position of the fracture lines. The extent of other bodily injuries and the mutilation of the face and head was so great that for some time the patient's life was despaired of. The right eye-ball was thrown out upon the cheek; a very large wound was made on the right side of the face just below the eye, and it was thought the anterior wall of the antrum was crushed. There was also a very large wound just under the chin upon the left and also the right side. The patient was unconscious for many hours after the accident. Practically nothing was done insofar as the fracture of the mandible was concerned for almost seven weeks after the date of the accident. *Fig. 8,* a Roentgenogram taken October 14, 1916, shows the lines of fracture fairly well. *Fig. 9* is a photograph of the casts of the case superimposed. These impressions were taken with modeling compound October 22, 1916. From

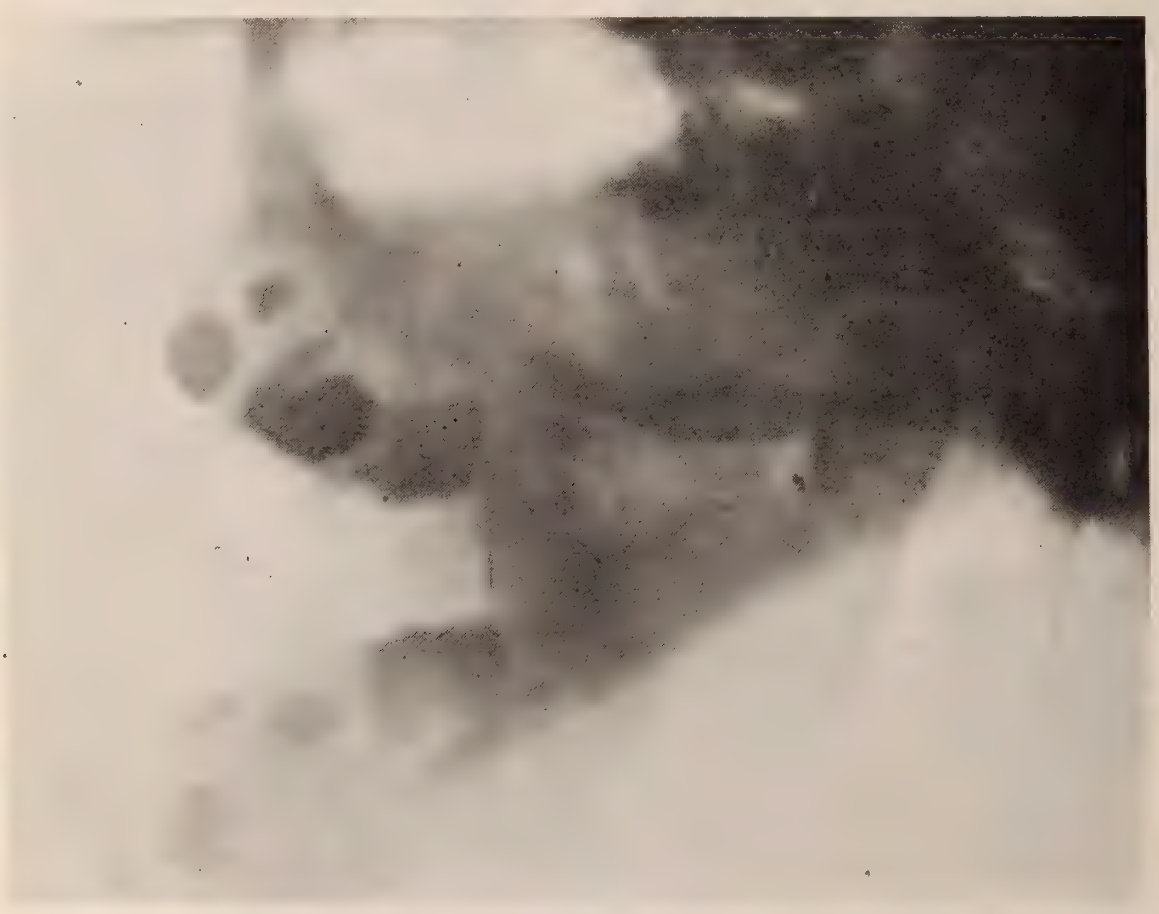

Fig. 6.

Fig. 6. (Case III)—Roentgenogram of fracture.

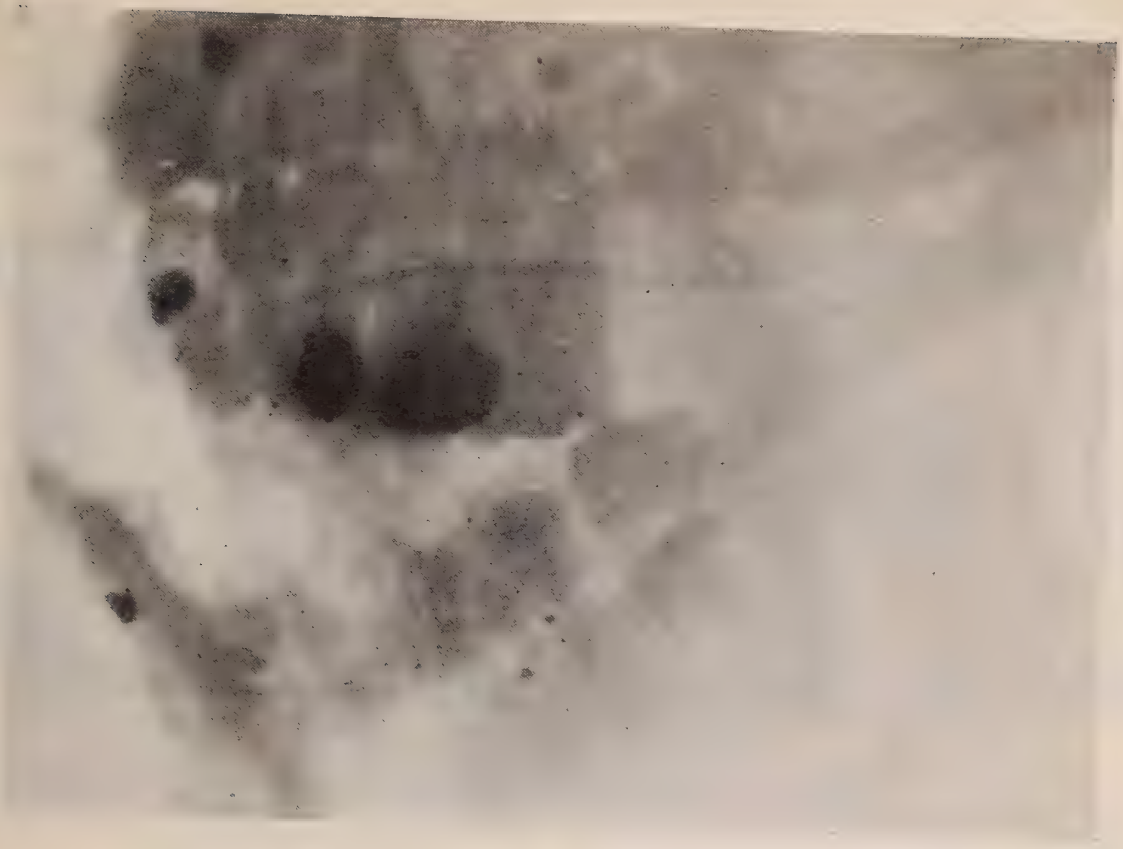

Fig. 7.

Fig. 7. (Case III)—Roentgenogram of fracture.

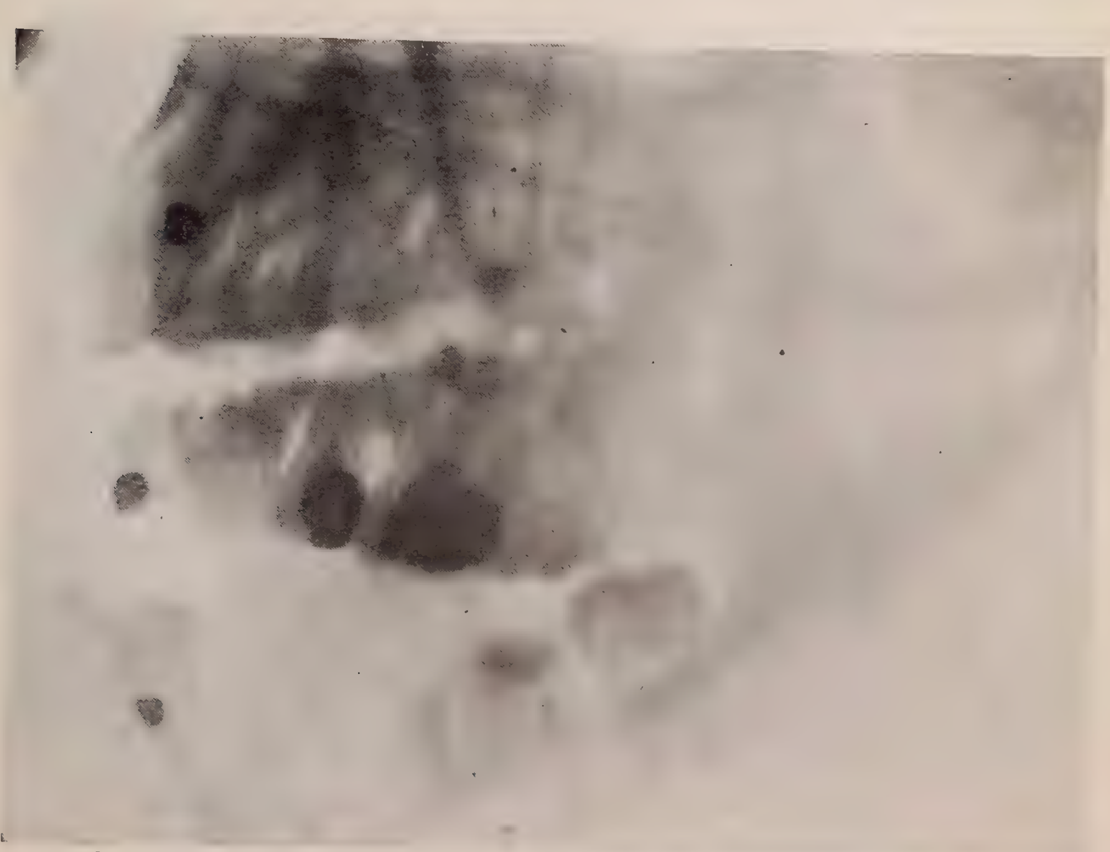

Fig. 8.

Fig. 8. (Case III)—Roentgenogram of fracture.

this may be gotten an idea of the extent of the mutilation insofar as the teeth were concerned. The upper incisors were entirely broken off at the gingival line; the lower right first bicuspid, cuspid and lateral were broken off; the line of fracture upon the right side being in this region. The crowns of all of the lower teeth from the second bicuspid to the third molar on the left side were broken off and thrown into the mouth. The line of fracture upon the left side was between the lower first and second bicuspid. At the time these impressions were taken most of the wounds of the face had closed excepting the two below the chin, the one upon the left side discharging pus continuously. By a comparison of *Figs. 8 and 11*, one may gain an idea of the result obtained by using an expansion arch and clamp bands. The

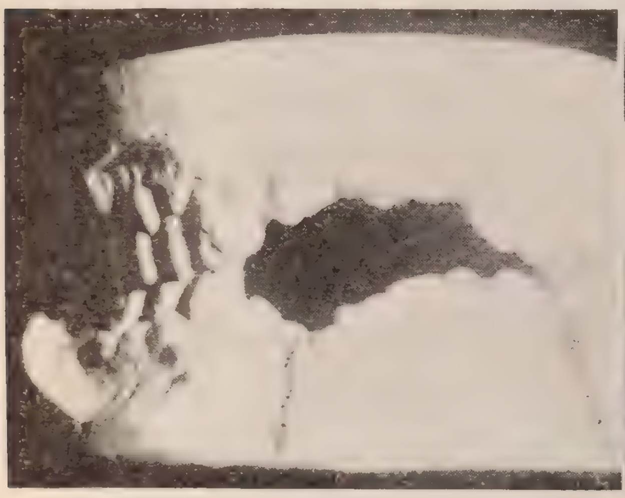

Fig. 9.

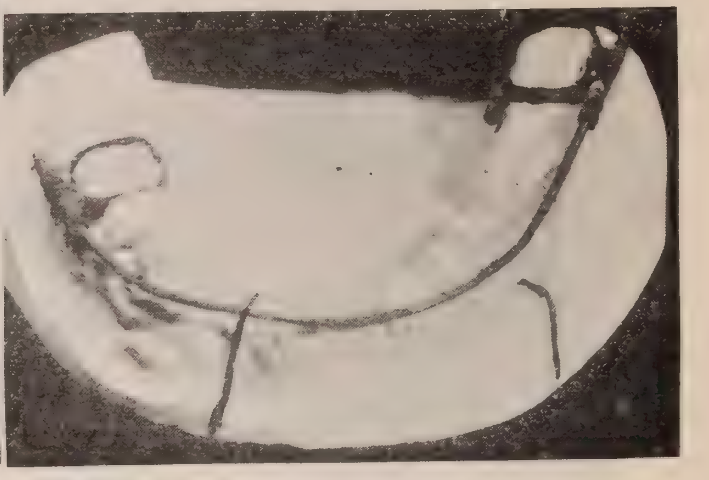

Fig. 10.

Fig. 9. (Case III)—Casts superimposed.

Fig. 10. (Case III)—Orthodontic appliance used in treatment. Location of fracture lines marked.

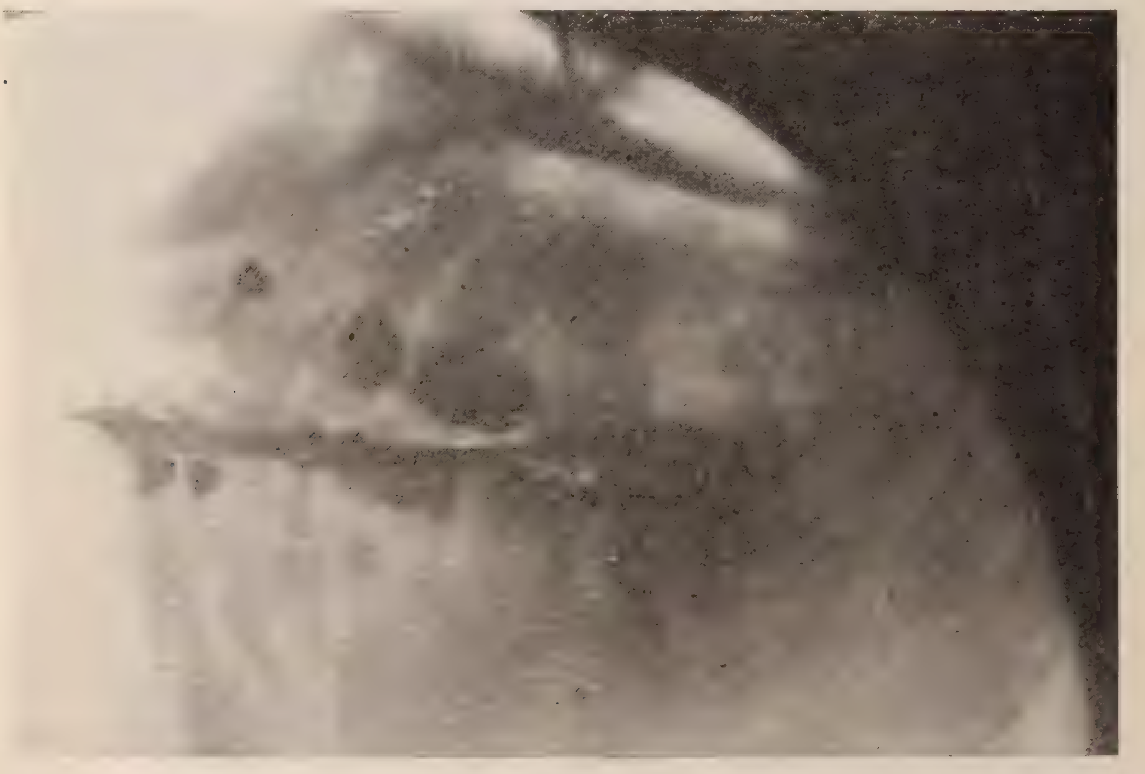

Fig. 11.

Fig. 11. (Case III)—Roentgenogram with splint in situ.

horizontal plane of the teeth in the anterior segment was almost correct as compared with the general position of the rest of the teeth, but this entire anterior segment, which at the time of the fracture was turned outward upon the face, was freely movable mesio-distally. *Fig. 10* is a photograph of the cast of the lower teeth showing the expansion arch and clamp bands as employed in the treatment of this case. Nuts, posterior and anterior to the tubes, were used as in *Case II.* Fortunately the lower left third molar was in good condition and could be used as an anchorage point. By placing a band upon it and upon the lower right first molar, and adjusting the arch, the anterior segment was manipulated from the position shown in *Fig. 8* to the position shown in *Fig. 11,* which is a Roentgenogram taken October 24, 1916, the day after the appliance was placed. This appliance was worn from October 23, 1916, to February 19, 1917, almost four months. During the greater part of this time pus was discharging from the wound upon the right side of the face. Periodically fragments of bone were removed from this wound, sometimes through the mucous membrane of the mouth and sometimes externally. The fracture upon the right side in the region of the cuspid united before the one upon the left side. Extensive prosthetic restorations will have to be made before the results can be said to be gratifying. While it is true that in this case the expansion arch and clamp bands did not hold the anterior segment which was wired to the arch, in absolute firmness or rigidity, it was the opinion of the surgeon in charge that what slight movement was present would stimulate to some extent the formation of callus. Absolute union upon the right side, however, did not occur until the last fragment of bone had been removed. The discharge ceased within three days after the removal of this last piece of bone.

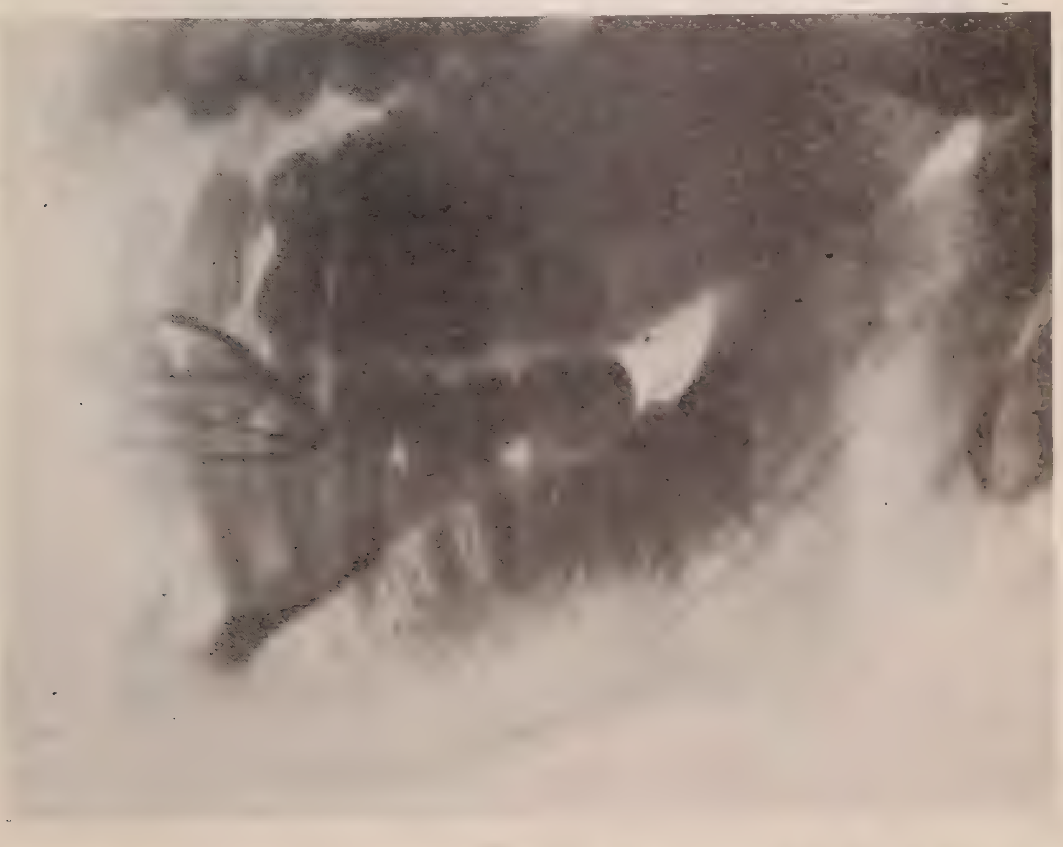

Fig. 12.

Fig. 12. (Case IV)—Roentgenogram of fracture after surgeon had wired bones.

Case IV: Fracture, which was also the result of an automobile accident, occurred November 1, 1916. The patient was taken immediately to the hospital and the surgeon in charge wired the bones. *Fig. 12* is a Roentgenogram after bones were wired. Silver wire was used and from what could be discerned from the appearance of the tissue at the time it was inspected, the wire had been inserted just below the necks of the teeth. On December 7, 1916, the silver wires were removed and the patient dismissed from the hospital with the instruction that the surgical work had been completed and that all that was now necessary was some work on the part of the dentist. *Fig. 13* is a photograph of the casts of this case, superimposed. These were made five weeks after the date of the accident and two days after the removal of the silver wires. They show the line of fracture between the left cuspid and the lateral incisor. They also show that while the surgeon had attempted to bring the bones into correct apposition and retain them with silver wire,

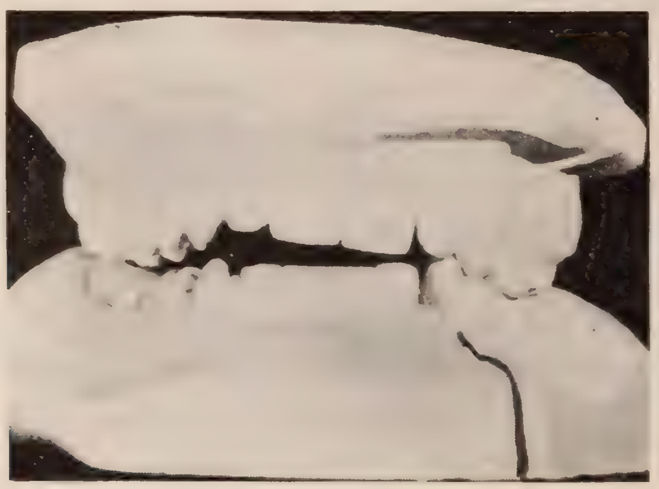

Fig. 13.

Fig. 13. (Case IV)—Casts superimposed, showing position of fracture and apposition of teeth.

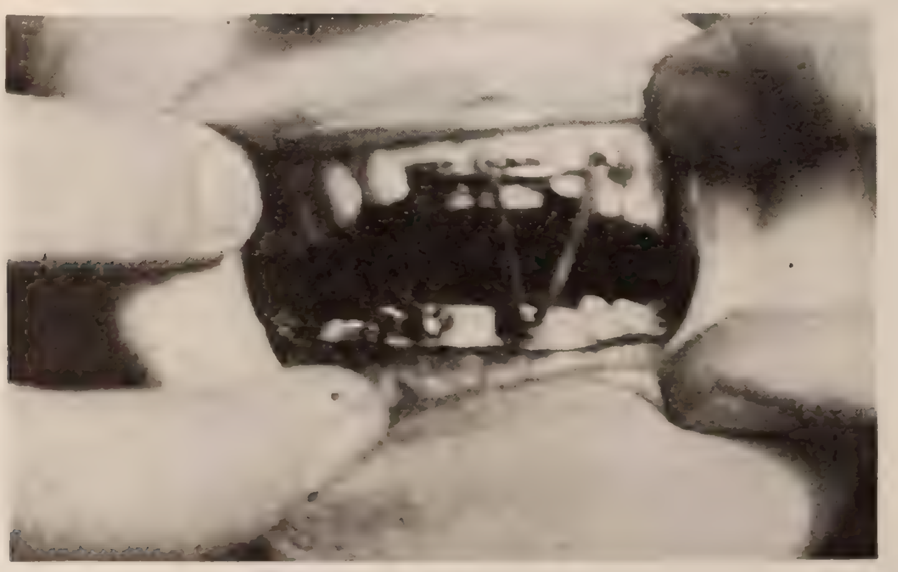

Fig. 14.

Fig. 14. (Case IV)—Orthodontic expansion arch and intermaxillary bands used in treatment.

he had overlooked to some extent the correct occlusion of the teeth. There was a downward and lingual displacement of the right segment and the patient was unable to bring the teeth of the right side into better occlusion than here shown. By examination it was determined that a fibrous incomplete union had occurred. Molar clamp bands and expansion arch were used in an attempt to secure again the correct occlusion of the teeth of the right side. By the use of the expansion arch the lingual displacement of the right fragment was overcome. By intermaxillary rubber bands, used as shown in *Fig. 14*, this right segment was drawn up into its correct occlusion with the upper teeth. The rubber bands were worn from December 11, 1916, to December 27, 1916, after which the expansion arch and clamp bands were worn as a sort of retaining appliance, the teeth being wired to the arch. With the nuts upon the expansion arch, posterior and anterior to the tubes,

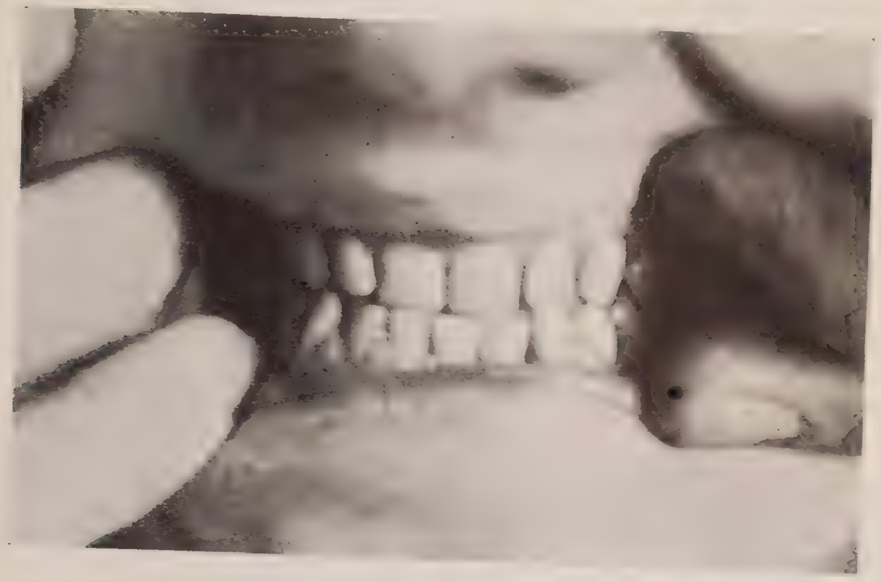

Fig. 15.

Fig. 15. (Case IV)—Final result.

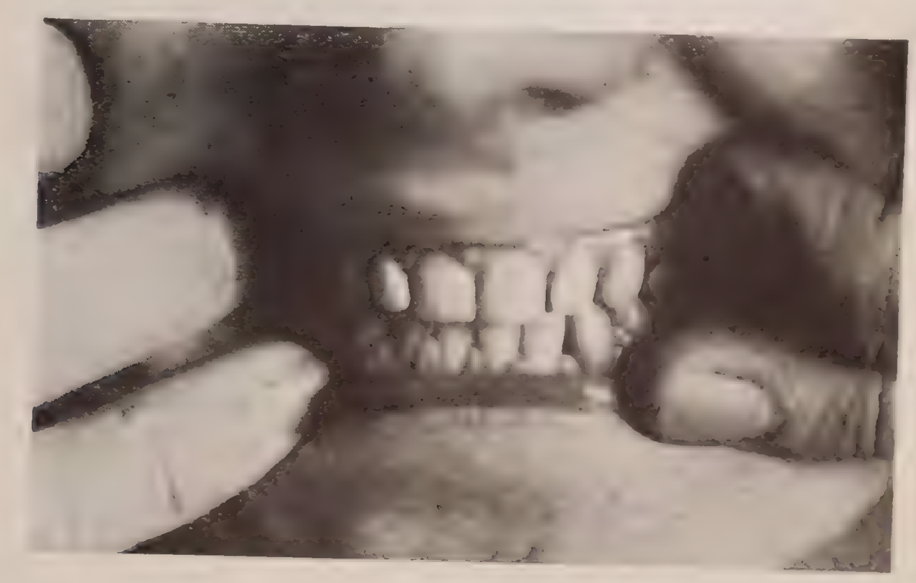

Fig. 16.

Fig. 16. (Case IV)—Final result.

the case was held in very good position until February 9, 1917, at which time all appliances were removed. *Figs. 15 and 16* show the final result. Had this case been taken at the time of fracture it is reasonable to suppose that with a very simple appliance, such as an expansion arch and molar clamp bands, the bones might have been held very easily and the necessity of using the intermaxillary rubber bands for regaining the correct occlusion been avoided. This case is only one which proves that this particular kind of work belongs in the field of the dentist.

INTERDENTAL SPLINTS

Case V: Accident occurred November 18, 1916. *Figs. 17 and 18,* Roentgenograms of the case, do not show very definitely the position of the fracture lines. *Figs. 19 and 20* are photographs of the plaster casts superimposed and show the location of the fractures. Upon the left side the third molar was displaced as shown in these casts; the fracture upon that side being between the roots of the second and third molar. Upon the right side the line of fracture was between the cuspid and lateral incisor. All of the teeth were present and it was decided to use an interdental splint.

Fig. 17.

CONSTRUCTION OF GOLD AND PLATINUM INTERDENTAL SPLINT

The upper cast, shown in *Figs. 19 and 20*, was mounted upon the articulator by using a face bow in the following manner: A small amount of wax was placed upon the fork of the face bow and this forced upon the upper incisors. The condyle bars of the face bow were placed over the condyles and this measurement transferred to the articulator, the upper cast

Fig. 18.

Figs. 17 and 18. (Case V)—Roentgenograms of fractures.

being mounted in the same relative position from the hinge of the articulator as the upper arch from the condyles. The lower cast, shown in *Figs. 19 and 20*, was then sawed in the lines of fracture and assembled upon the articulator in correct occlusion to the upper cast.

The occlusal thirds of the teeth were then coated with sandarac varnish. Platinum foil (1-1000) was forced roughly over the occlusal surfaces of the upper and lower teeth with the thumb and finger and afterward thoroughly burnished with ball burnisher. A piece of base-plate wax was then softened and forced

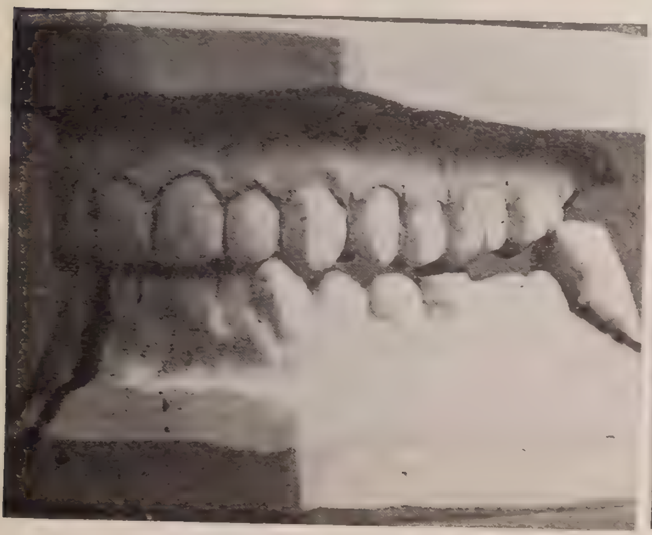

Fig. 19.

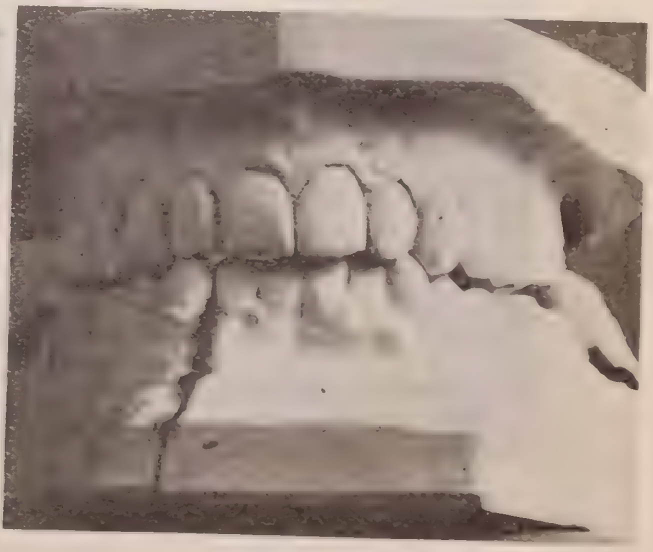

Fig. 20.

Fig. 19. (Case V)—Casts superimposed, showing location of fracture lines.
Fig. 20. (Case V)—More anterior view than Fig. 19.

over the platinum foil and attached to it with a warm spatula. This then was removed from the cast, trimmed to the occlusal thirds of the teeth, invested and 6-karat solder flowed over the entire surface to reinforce or strengthen. These two plates as made were then replaced upon the upper and lower casts upon the articulator and this opened to the proper point. They were waxed together there, removed from the articulator and invested.

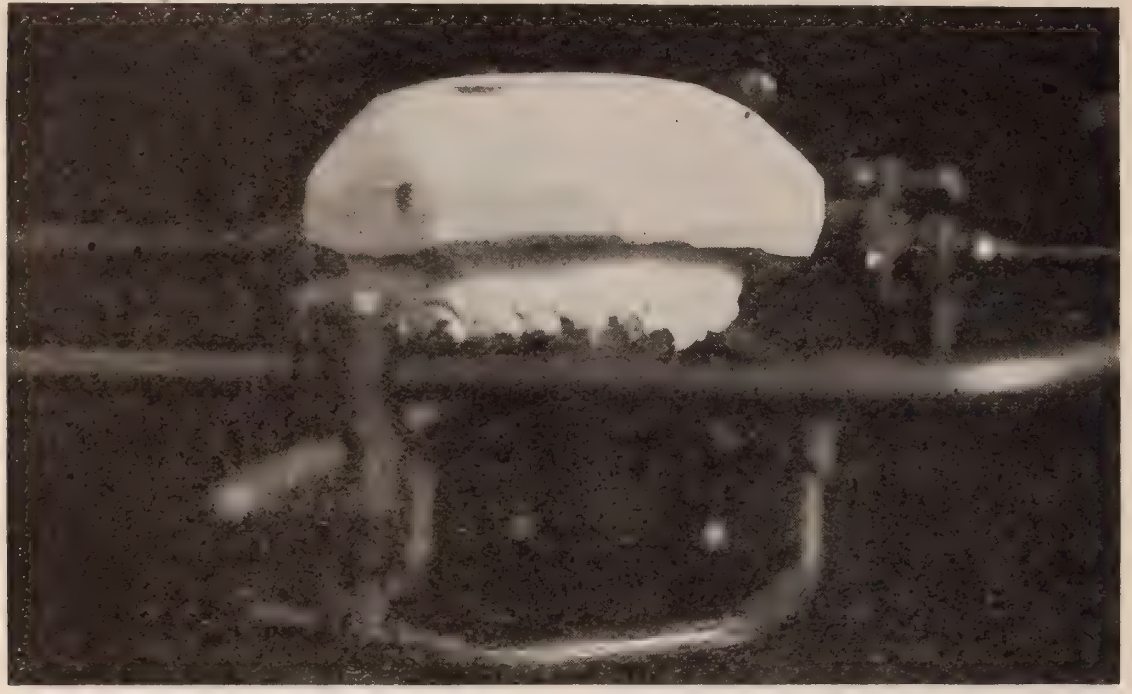

Fig. 21.

Fig. 21. (Case V)—Showing method of mounting casts on articulator.

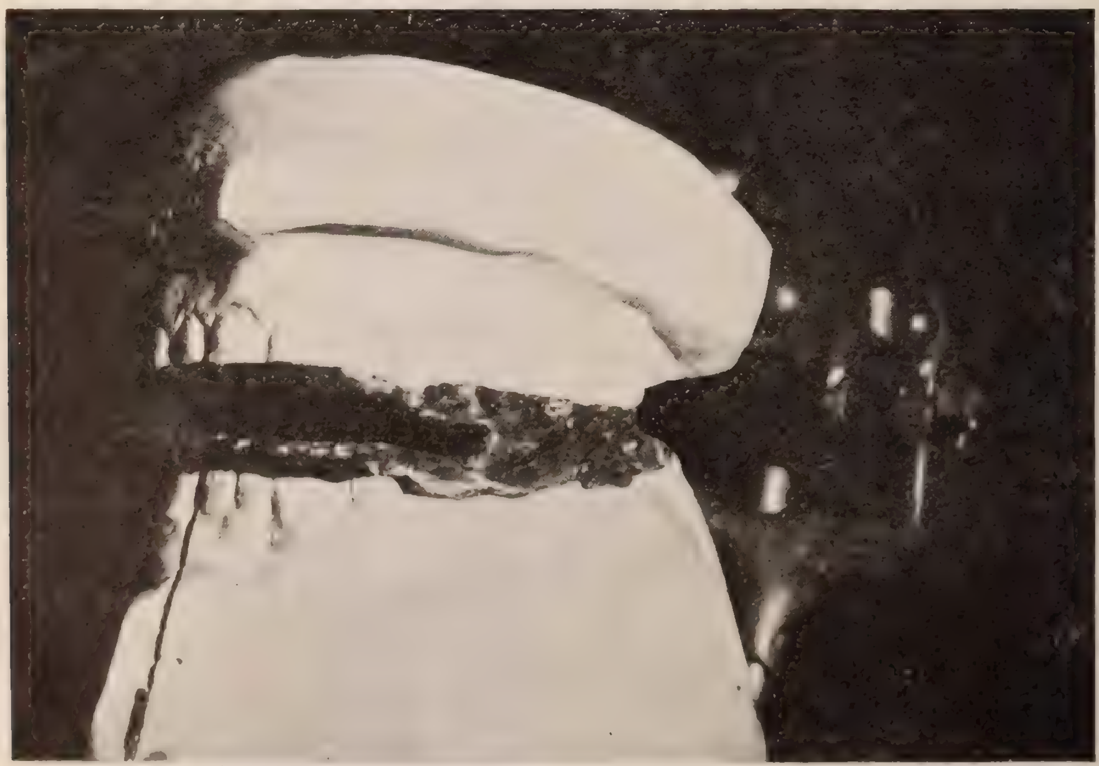

Fig. 22.

Fig. 22. (Case V)—Interdental splint constructed and ready for insertion.

Small posts of clasp wire, about 12-gauge, may be used as braces between the opposing segments. In this case the plates were soldered together from about the second bicuspid back, the entire anterior portion being left open. *Fig.* *21* shows the method of mounting the cast upon the articulator using the face bow, and *Fig. 22* the completed splint made of gold and platinum ready for insertion.

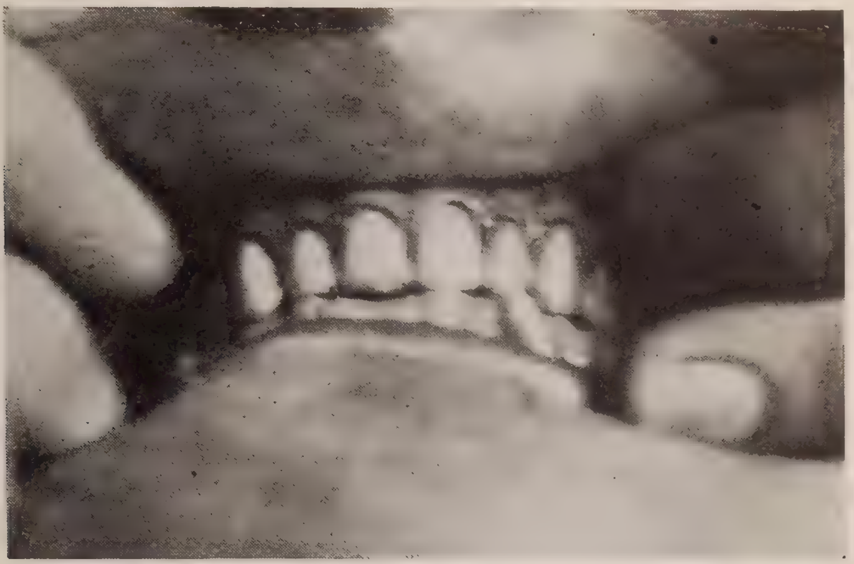

Fig. 23.

Fig. 23. (Case V)—Final result—no teeth were lost.

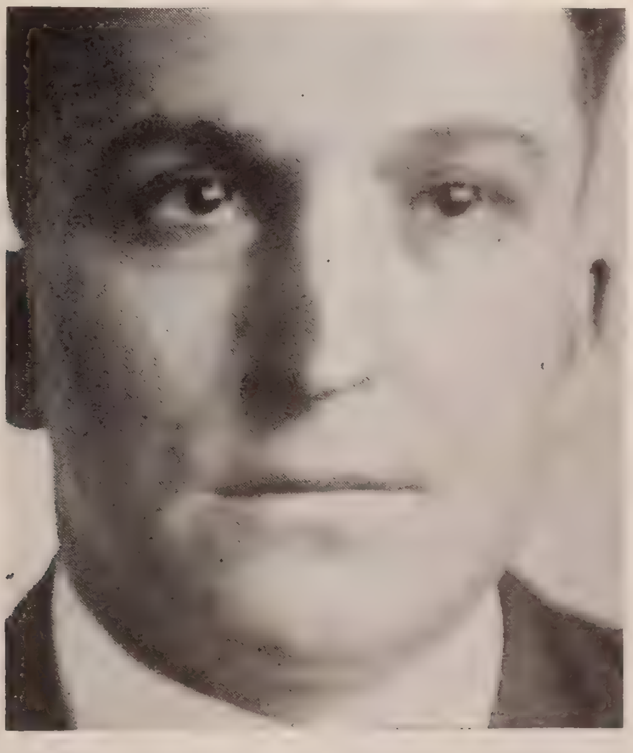

Fig. 24.

Fig. 24. (Case V)—Final result—no facial deformity.

In this case the splint was worn between three and four weeks and held in position with a Barton bandage. *Fig. 23* shows final result in respect to occlusion and *Fig. 24* is the final photograph showing no facial deformity.

About one week after the splint was removed an abscess developed in the region of the anterior fracture, but it was of short duration and did not in any way undo what had been accomplished.

Case VI. Fracture was the result of an automobile accident and *Fig. 25* is a Roentgenogram taken March 10, 1916 (day of accident), showing the line of fracture upon the left side in the region of the second and third molars.

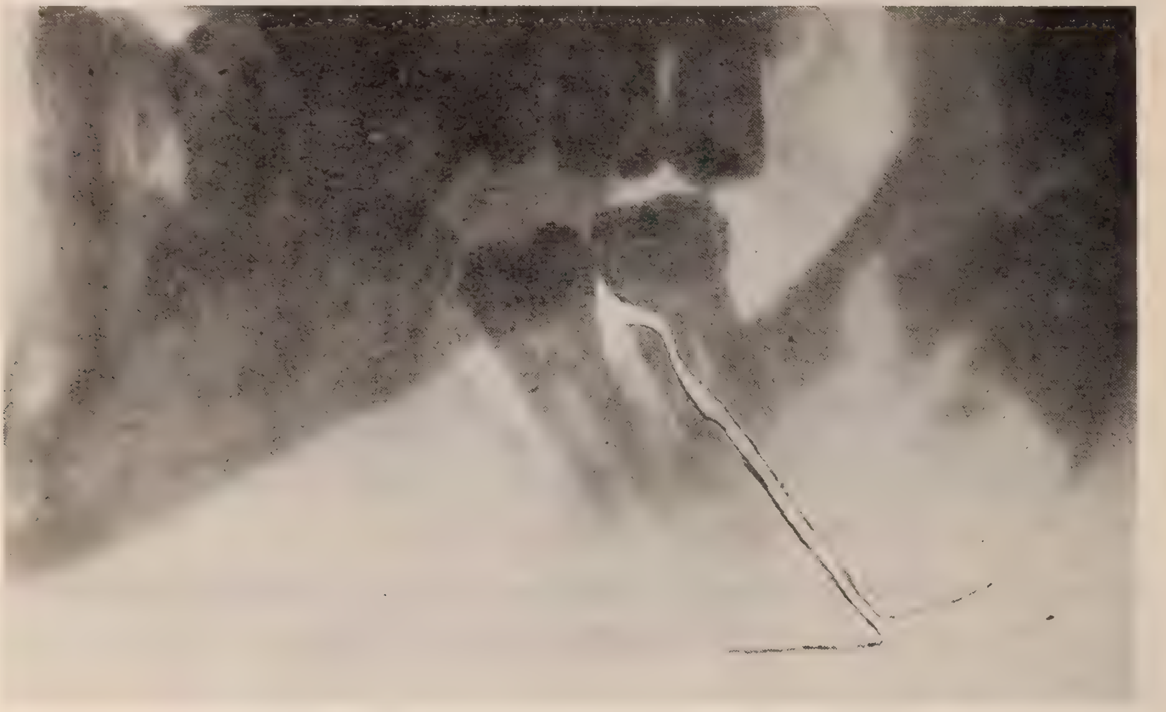

Fig. 25.

Fig. 25. (Case VI)—Roentgenogram of fracture.

The mesial root of the third molar was split away from the main body of the tooth. In this case there was no laceration of the face or of the mucous membrane. A gold and platinum interdental splint was constructed as described in *Case V*, and *Fig. 28*, a Roentgenogram taken three days after the date of

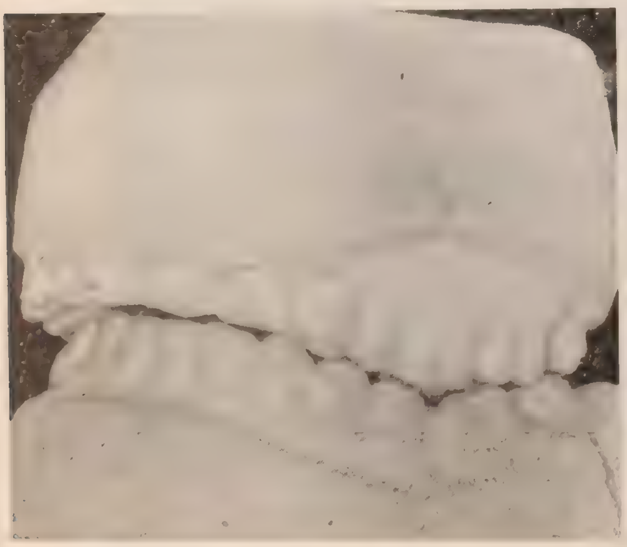

Fig. 26.

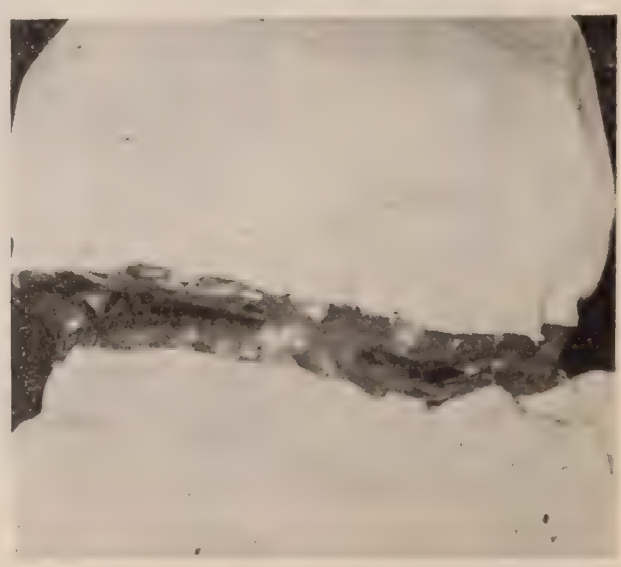

Fig. 27.

Fig. 26. (Case VI)—Lower cast sawed at fracture line, occluded with the upper and both mounted upon articulator.

Fig. 27. (Case VI)—Splint constructed ready for insertion.

fracture, shows the apposition of the bones after the splint had been placed in the mouth. The teeth were held into this splint by the use of a Barton

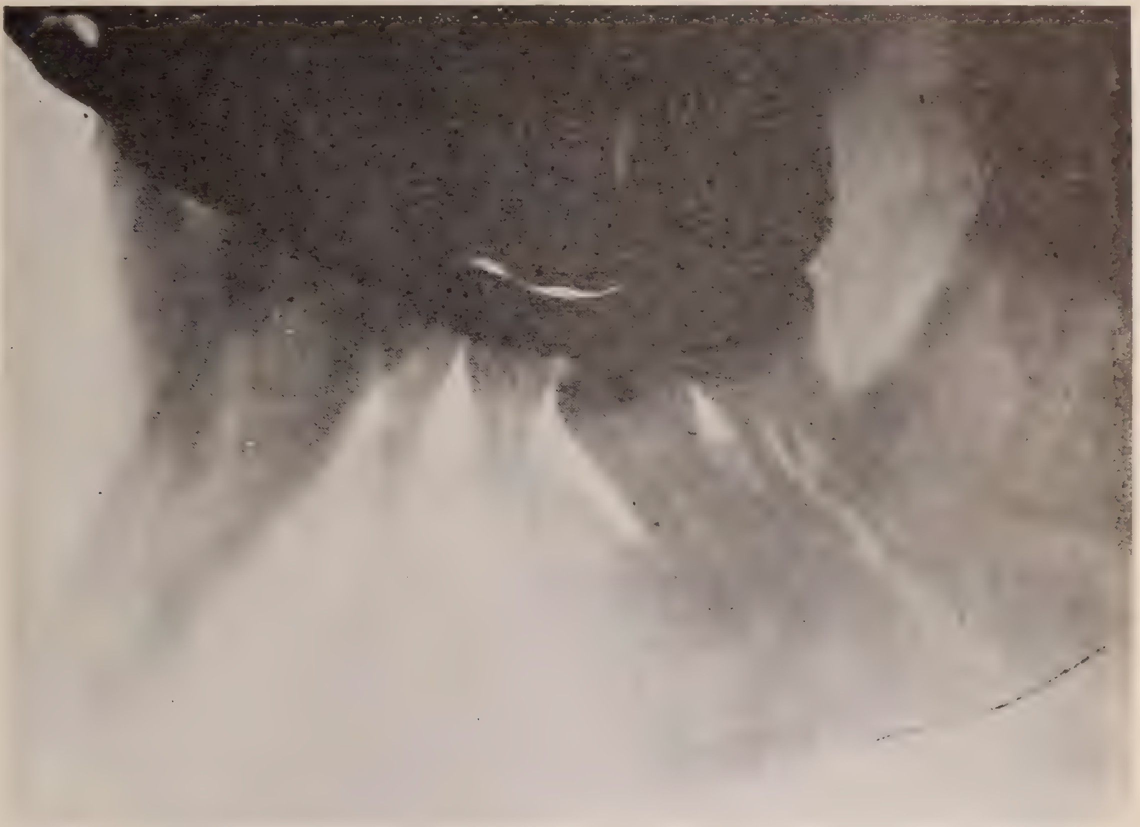

Fig. 28.

Fig. 28. (Case VI)—Roentgenogram of splint in situ.

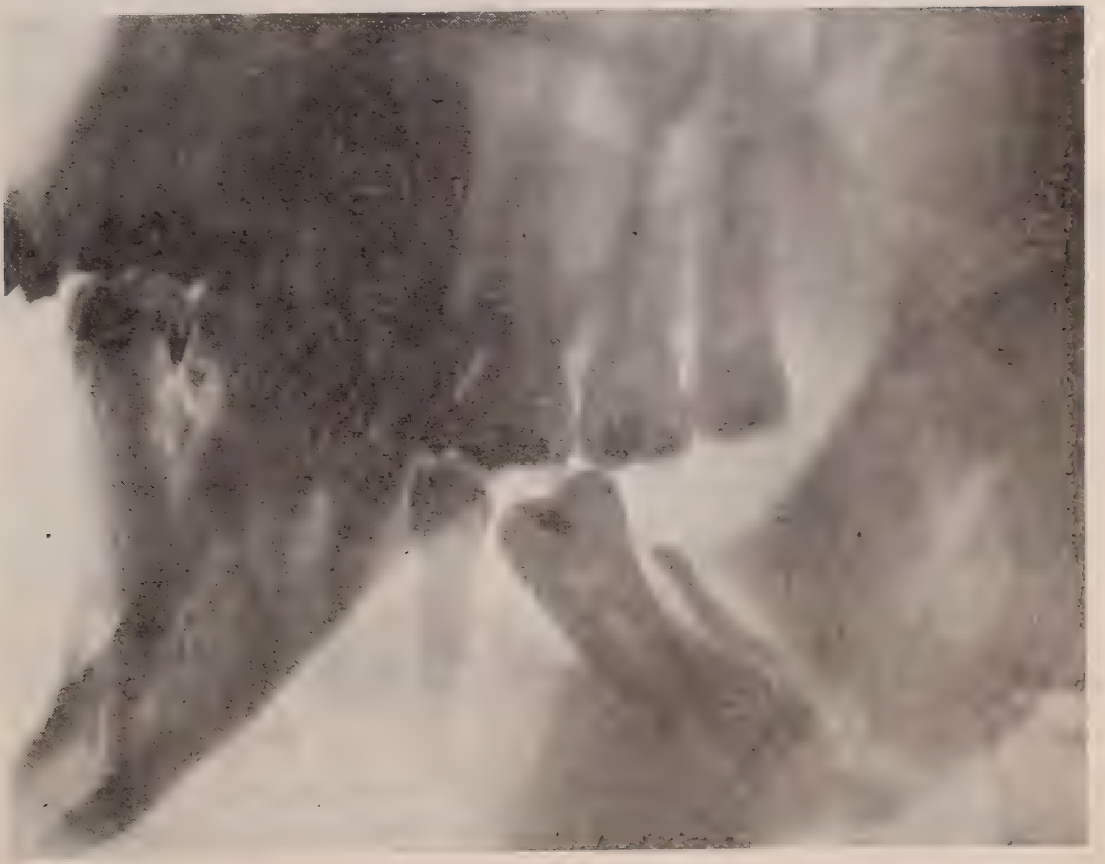

Fig. 29.

Fig. 29. (Case VI)—Roentgenogram of case. Crown and distal root of lower left third molar had been extracted.

bandage. It was considered fortunate that the distal root of the fractured molar was firmly seated in the posterior segment for this afforded a means of holding it in proper position. It was expected, of course, that the pulp would die in this tooth and an abscess result later on, but considered best to leave it in position if possible until the fragments united. *Fig. 26* is a photograph of the casts mounted upon the articulator. There was a marked over-bite, which gave ample feeding space through the anterior portion of the splint. *Fig. 27* shows the splint constructed and ready for insertion. This was worn between three and four weeks, when a very good fibrous union had occurred.

Fig. 29 is a Roentgenogram taken May 21st, about two months after the date of fracture. The root here shown in the line of fracture is the mesial root of the third molar. The crown and distal root of this molar had been removed by an extracting specialist in the time intervening between the removal of the splint and the date of this Roentgenogram. He undoubtedly considered it advisable to leave the mesial root of this molar until union of the bones had become more perfect in this region. Undoubtedly the root here shown has long since been removed. No infection of any sort occurred during the treatment of this case.

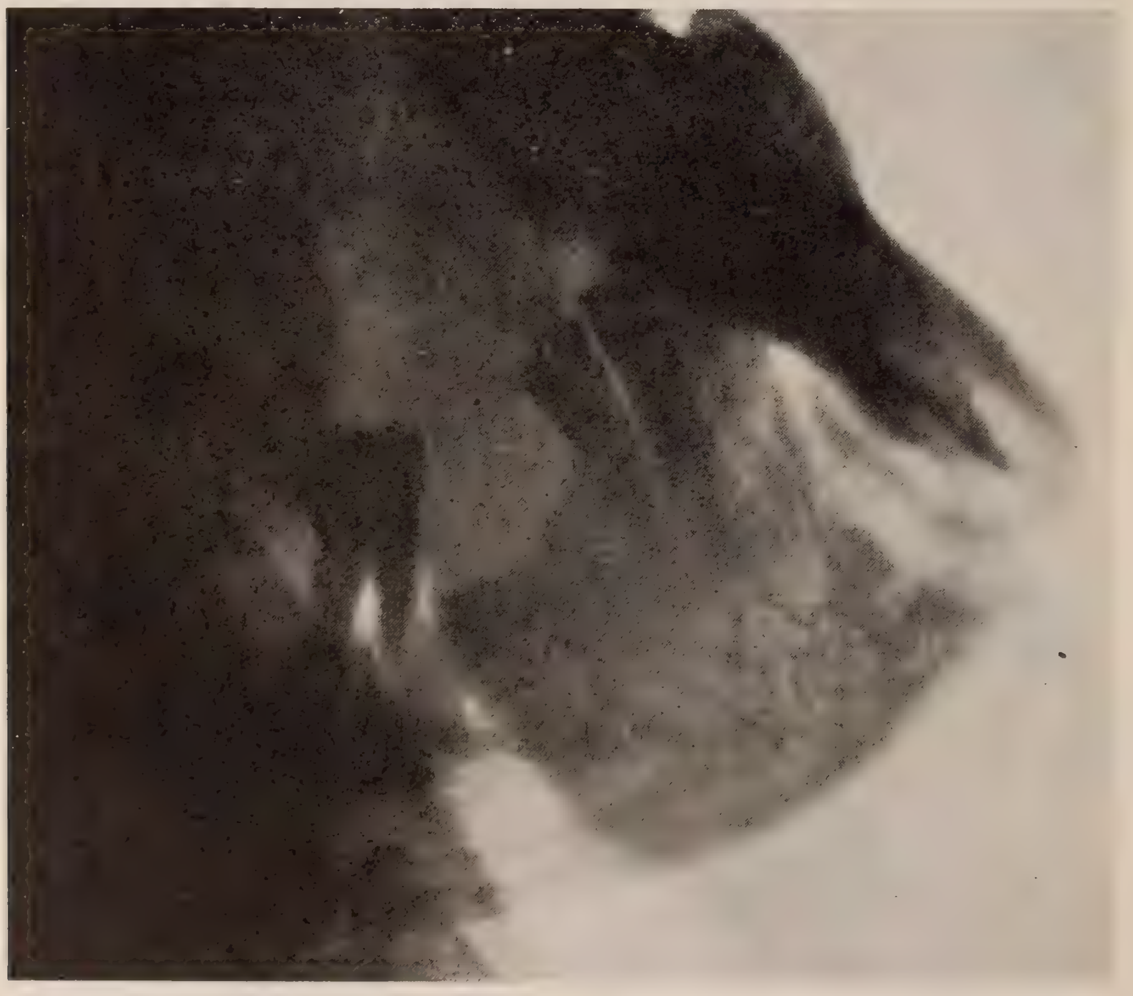

Fig. 30.

Fig. 30. (Case VII)—Roentgenogram of fracture at symphysis.

Case VII: This unfortunate man was an epileptic. He fell upon the pavement, striking the point of the chin. The mandible was fractured at the symphysis and across the ramus on the right side. *Figs. 30 and 31*, dated July 14, 1915, are Roentgenograms showing the position of these fractures.

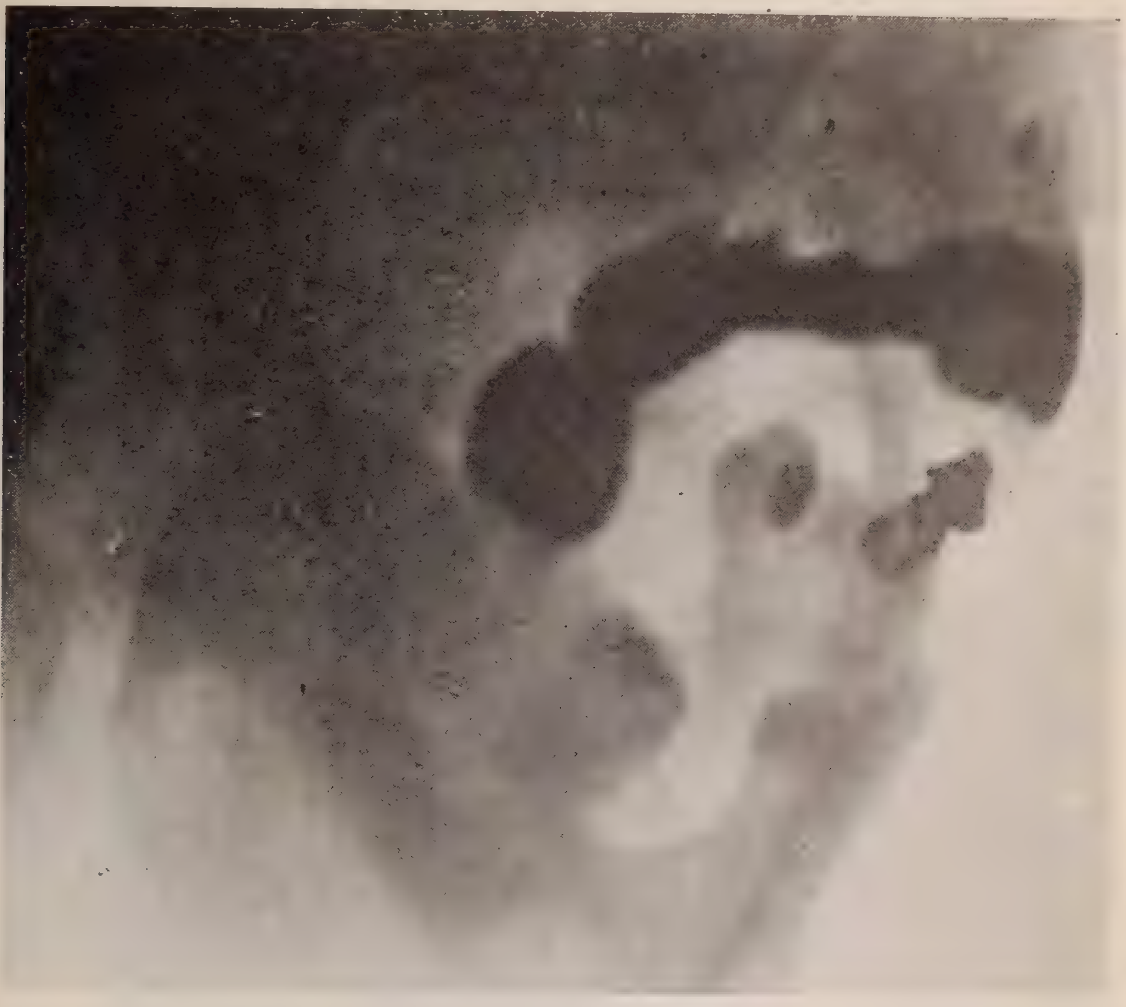

Fig. 31.

Fig. 31. (Case VII)—Roentgenogram of fracture in ramus.

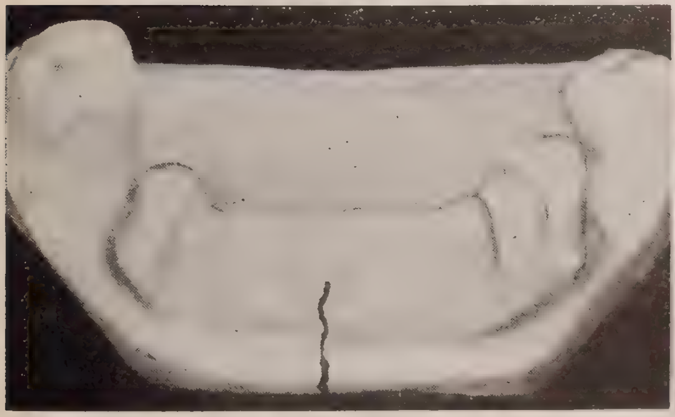

Fig. 32.

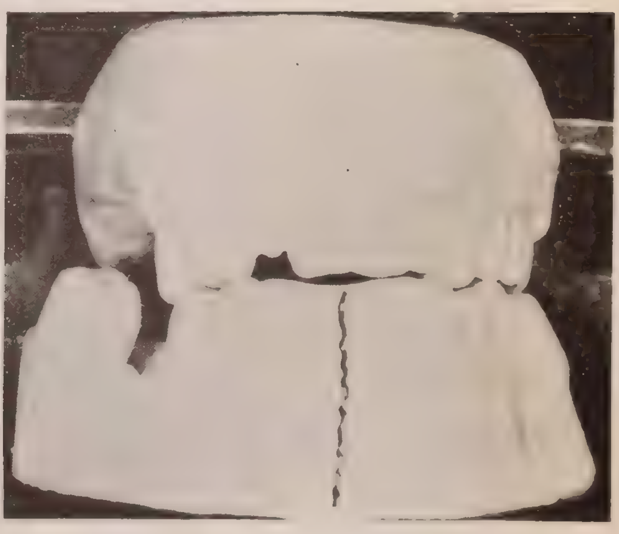

Fig. 33.

Fig. 32. (Case VII)—Cast of lower teeth, showing fracture line.

Fig. 33. (Case VII)—Lower cast sawed and occluded to upper and both mounted on articulator, using face bow.

Impressions of the teeth were taken in modeling compound and mounted upon the articulator, using the face bow as described in *Case V*. *Fig. 32* is a photograph of the lower cast, showing the line of fracture between

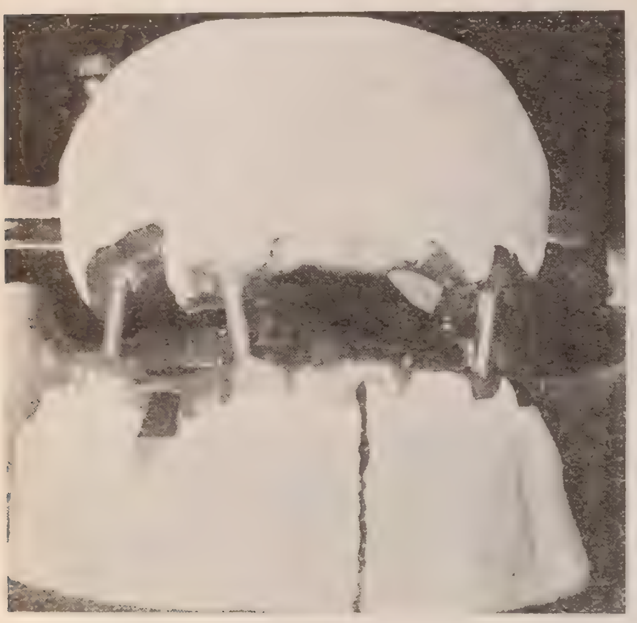

Fig. 34.

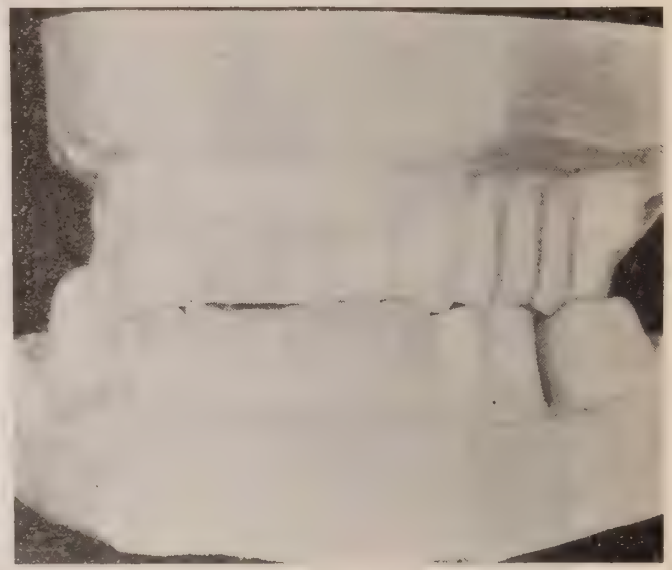

Fig. 35.

Fig. 34. (Case VII)—Splint constructed and ready for insertion.
Fig. 35. (Case VII)—Photo of casts after treatment was complete. Bridge was used above.

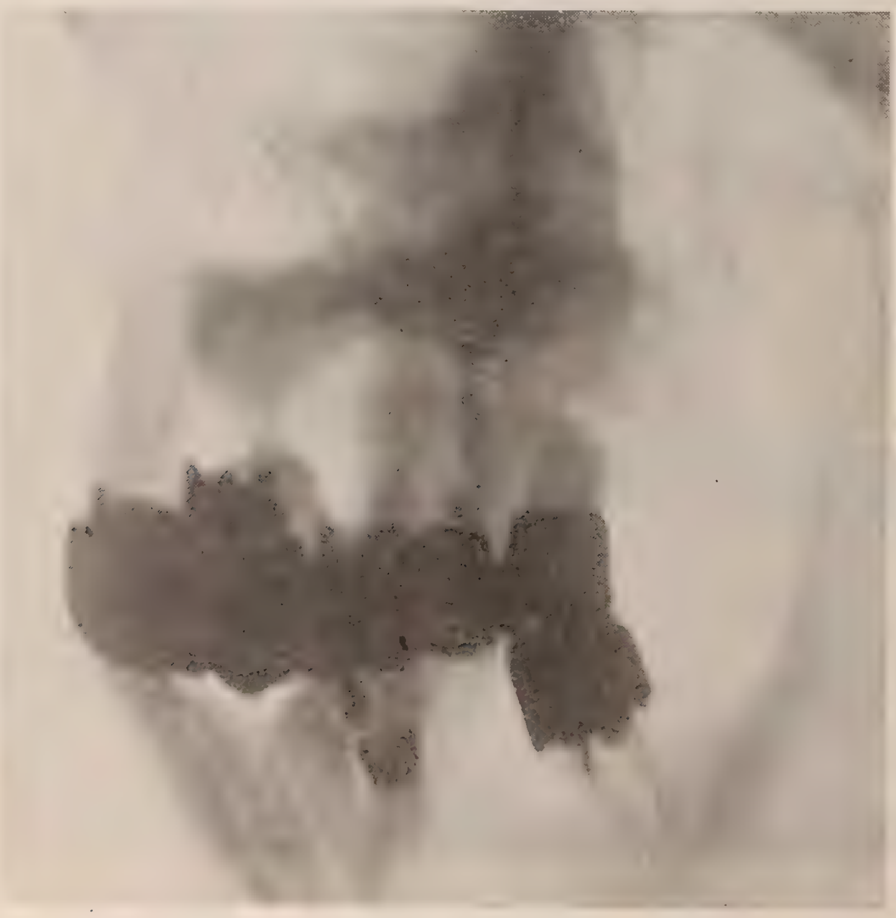

Fig. 36.

Fig. 36. (Case VII)—Roentgenogram of finished case.

the central incisors with a slight downward displacement of the right side. *Fig. 33* is a photograph of the plaster casts mounted upon the articulator, and shows the extent to which the upper anterior teeth were broken at the time of the accident. Case was treated by using a gold and platinum interdental splint. *Fig. 34* shows the splint constructed and ready for insertion. It may be noted that the teeth were set fairly well apart in the construction of this splint. Possibly if this case was to be treated again the casts would have been set closer together. However, the patient was very comfortable, indeed, with this splint in place, which was held by using a Barton bandage. Upon the upper right side there were no teeth present and a saddle was made to rest directly upon the gum in this location by burnishing platinum foil directly to the cast as has been described. This splint was worn about four weeks and the result was very pleasing. Later the upper anterior roots were extracted and this entire portion replaced with bridge work. *Fig. 35* is a photograph of the casts after this prosthetic restoration had been completed. The patient had occasion to return to the hospital a few months later and the surgeon insisted upon a Roentgenogram at that time. *Fig. 36* is the picture as taken, the date being October 4, 1915.

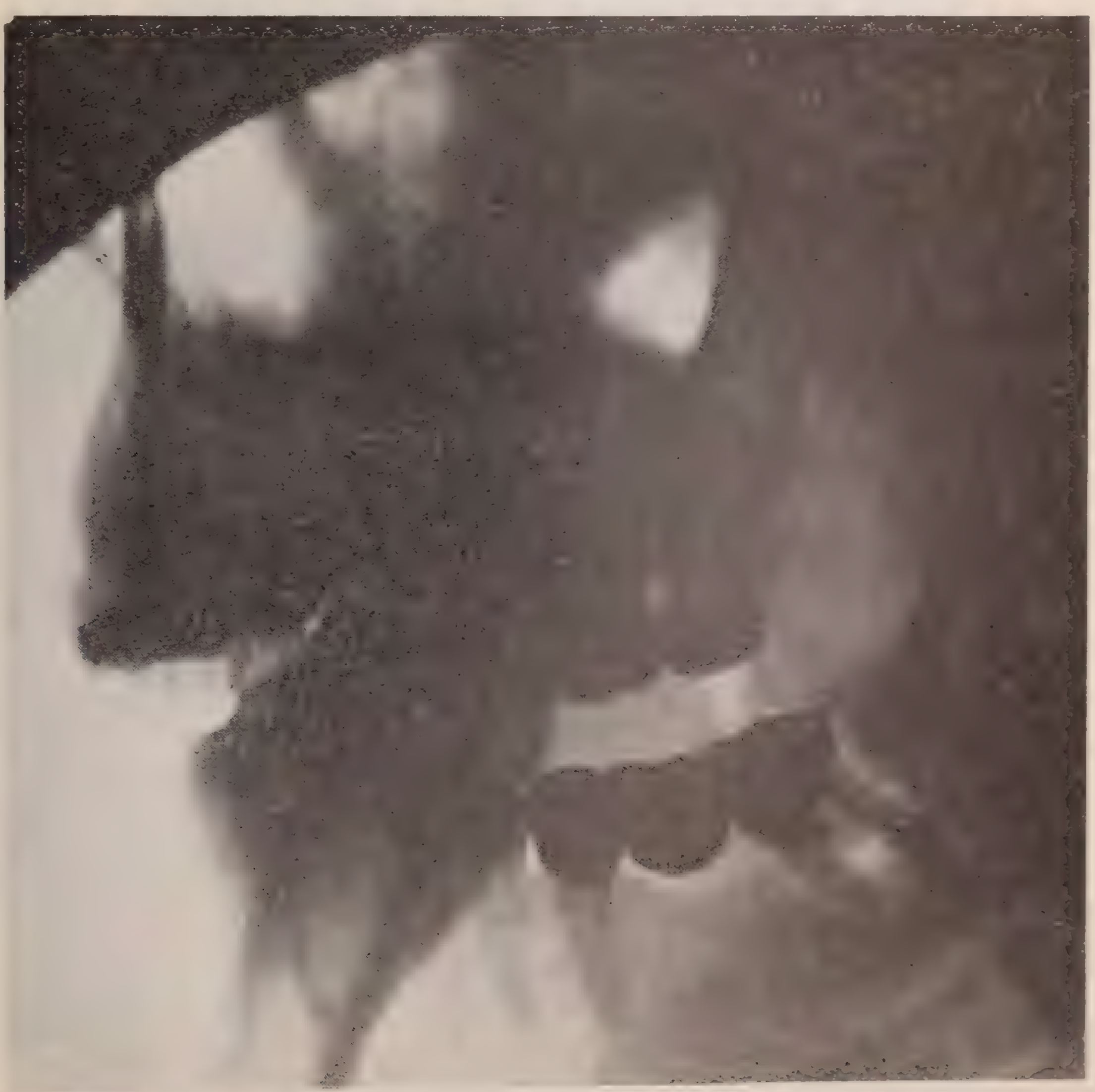

Fig. 37.

Fig. 37. (Case VIII)—Roentgenogram of fracture.

Case VIII: Fracture was entirely posterior to the teeth on the left side. *Fig. 37* is a Roentgenogram taken March 2, 1916, the day of the accident. There was a bridge just anterior to the fracture and the roots of the molar supporting it were not well fitted. There was also an area of rarefaction at the apex of the distal root of this tooth. The mucous membrane was torn, permitting the ingress of saliva at the point of fracture. It was feared also that the presence of this area of rarefaction at the apex of the distal root of the molar which was practically in the line of fracture, might also complicate matters.

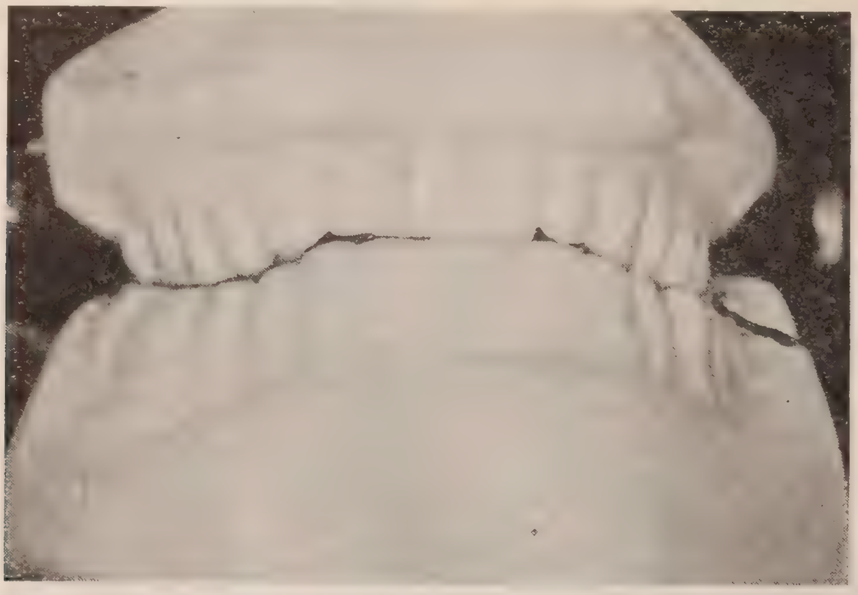

Fig. 38.

Fig. 38. (Case VIII)—Lower cast sawed at fracture line, occluded with upper and mounted on articulator, using face bow.

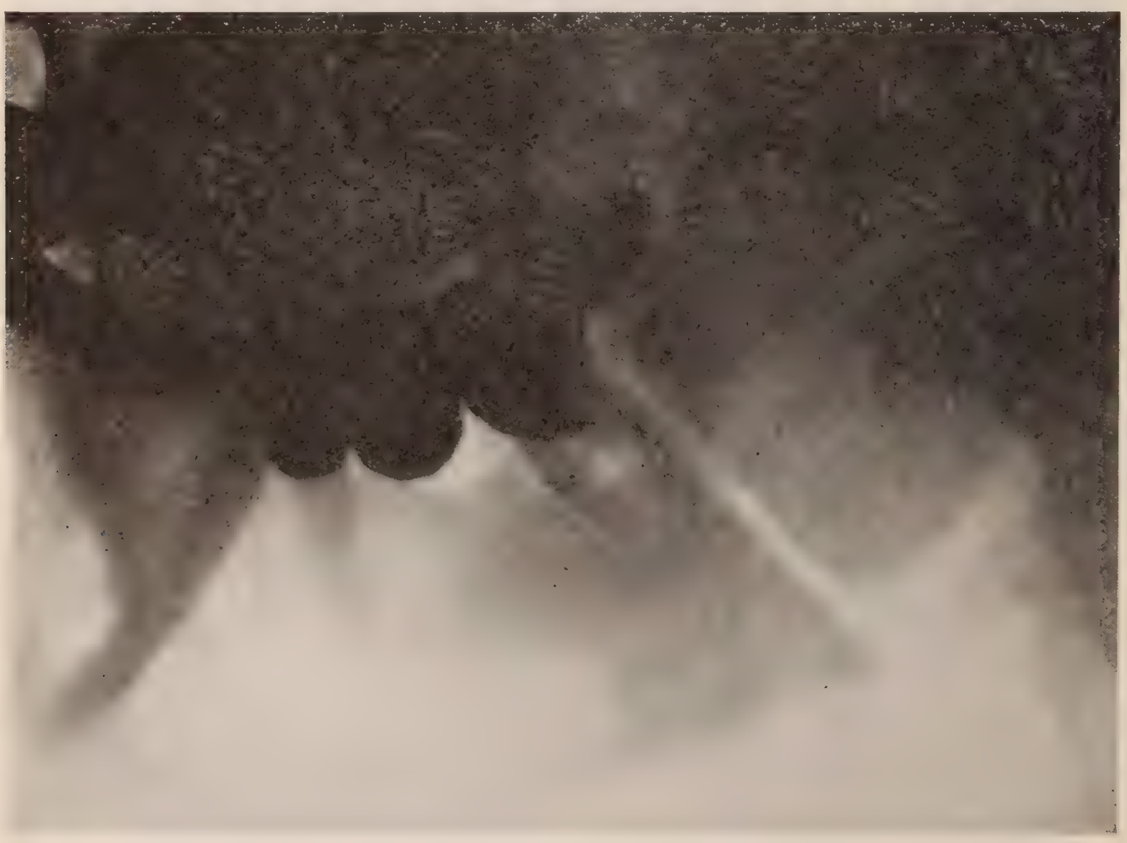

Fig. 39.

Fig. 39. (Case VIII)—Roentgenogram of case after splint was inserted. Apposition of bones not good.

Impressions were taken in modeling compound, casts made and mounted upon the articulator as described in *Case V*. *Fig. 38* is a photograph of the casts mounted upon the articulator. There was very good occlusion of the teeth, there being none missing excepting the one which was supplied by bridge work just anterior to the fracture. A splint of gold and platinum was constructed and inserted four days after the date of accident. *Fig. 39* is a Roentgenogram taken after the insertion of this splint. In constructing this, a small saddle was attached posterior to the main body of the splint to rest upon the gum tissue firmly for the purpose of forcing the ramus downward into position. But it may be noted in *Fig. 39* that the apposition of the bones in this location was not correct. This splint was removed, the braces between the upper and lower plates shortened as shown in *Fig. 40*, and again replaced and a Roentgenogram made. This negative, unfortunately, was lost, but judging from it the apposition of the bones in the fractured region was no better after the insertion of the modified splint than at first; therefore, the idea of the splint was abandoned. The teeth were wired together firmly; in doing this, 28-gauge brass wire was used and the cross wiring method employed as shown in *Fig. 41*, a Roentgenogram dated March 7, 1916, or five days after the fracture. It may be noted by a comparison of *Figs. 39 and 41* that no better apposition of the bones was secured by wiring the teeth firmly together than by employing the first splint, which set the jaws very widely apart, yet it was felt that no better result could be obtained under the circumstances. There could be little doubt of perfect occlusion finally when the teeth were firmly wired together, though the apposition of the bones was not absolutely correct.

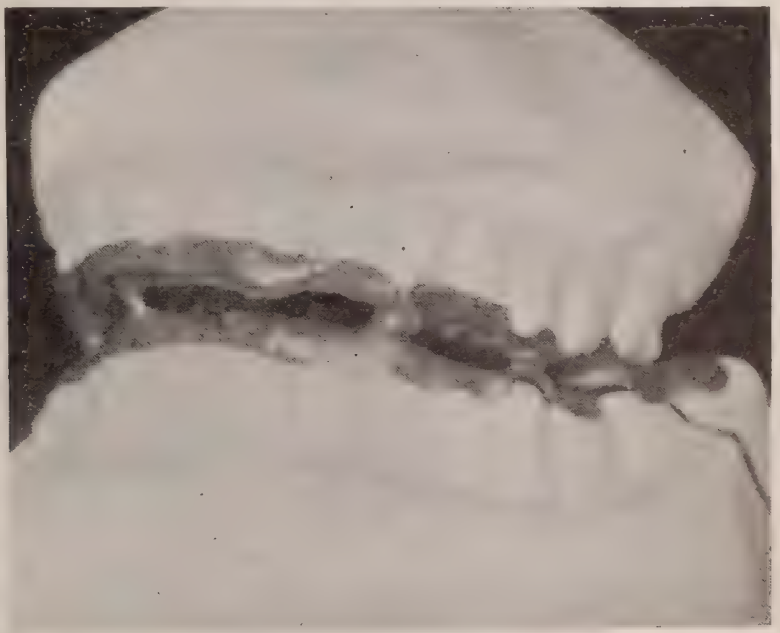

Fig. 40.

Fig. 40. (Case VIII)—Splint after readjustment. Roentgenogram of case after readjusted splint was inserted, showed no better result.

There was considerable discharge from this wound into the mouth during the continuance of the treatment, otherwise the patient seemed com-

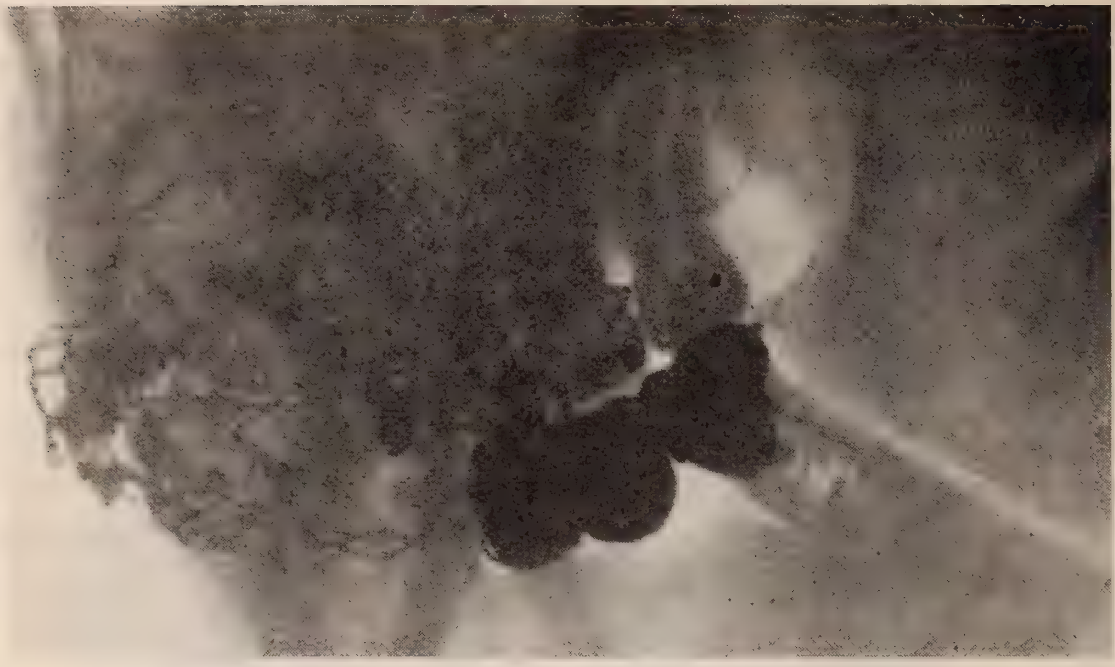

Fig. 41.

Fig. 41. (Case VIII)—Roentgenogram of case wired; interdental wires.

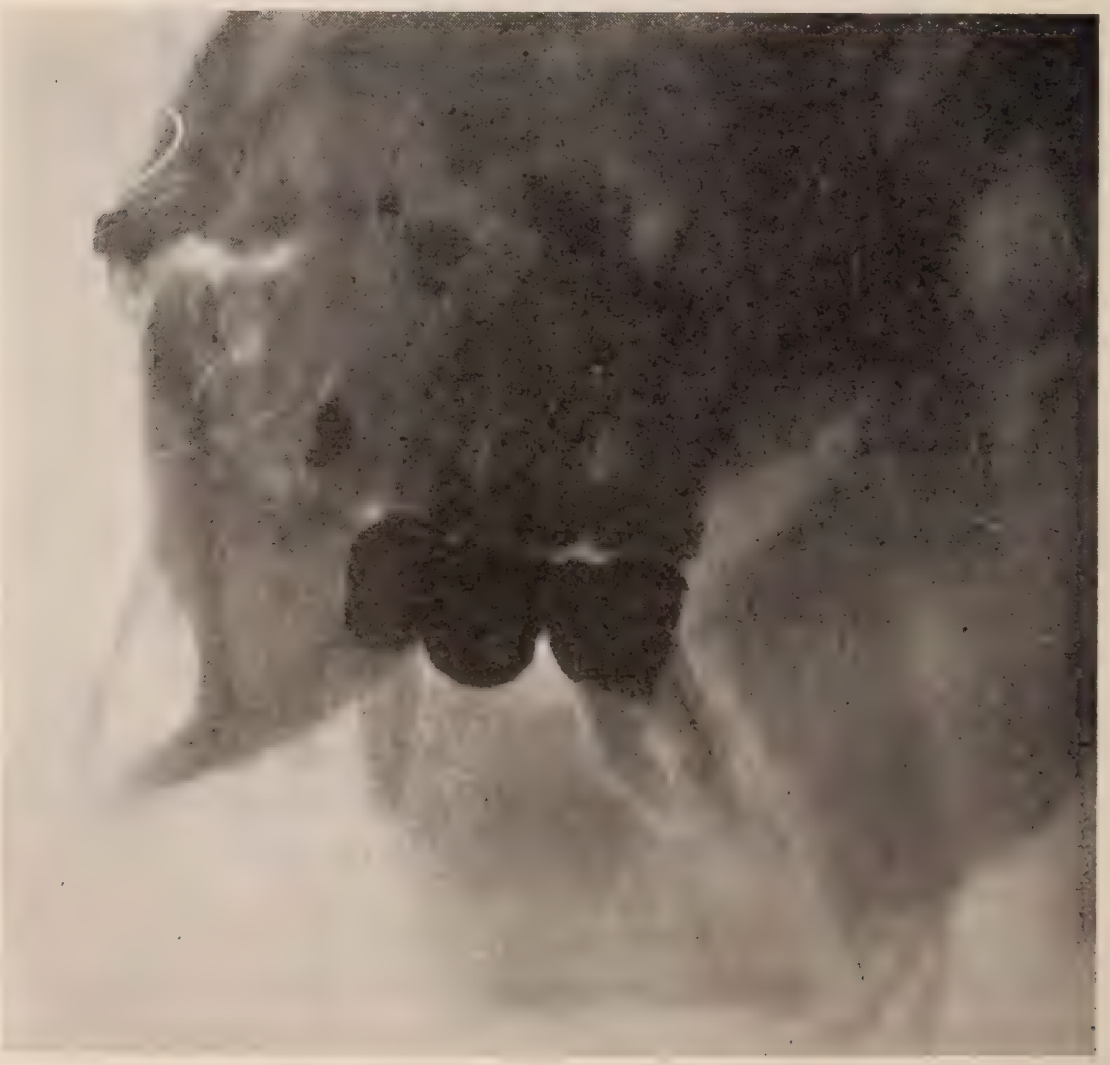

Fig. 42.

Fig. 42. (Case VIII)—Final Roentgenogram.

fortable. On April 5th, or about four weeks after the teeth were wired together, all wires were removed. The result was very good occlusion and no deformity of the face. *Fig. 42* is a Roentgenogram taken May 10, 1916, or about one month after the interdental wires were removed. There was still a very definite area of rarefaction about the apex of the root of the molar approximating the line of fracture. The bridge was then cut and this lower molar extracted. Sufficient union had occurred by this time to justify this extraction.

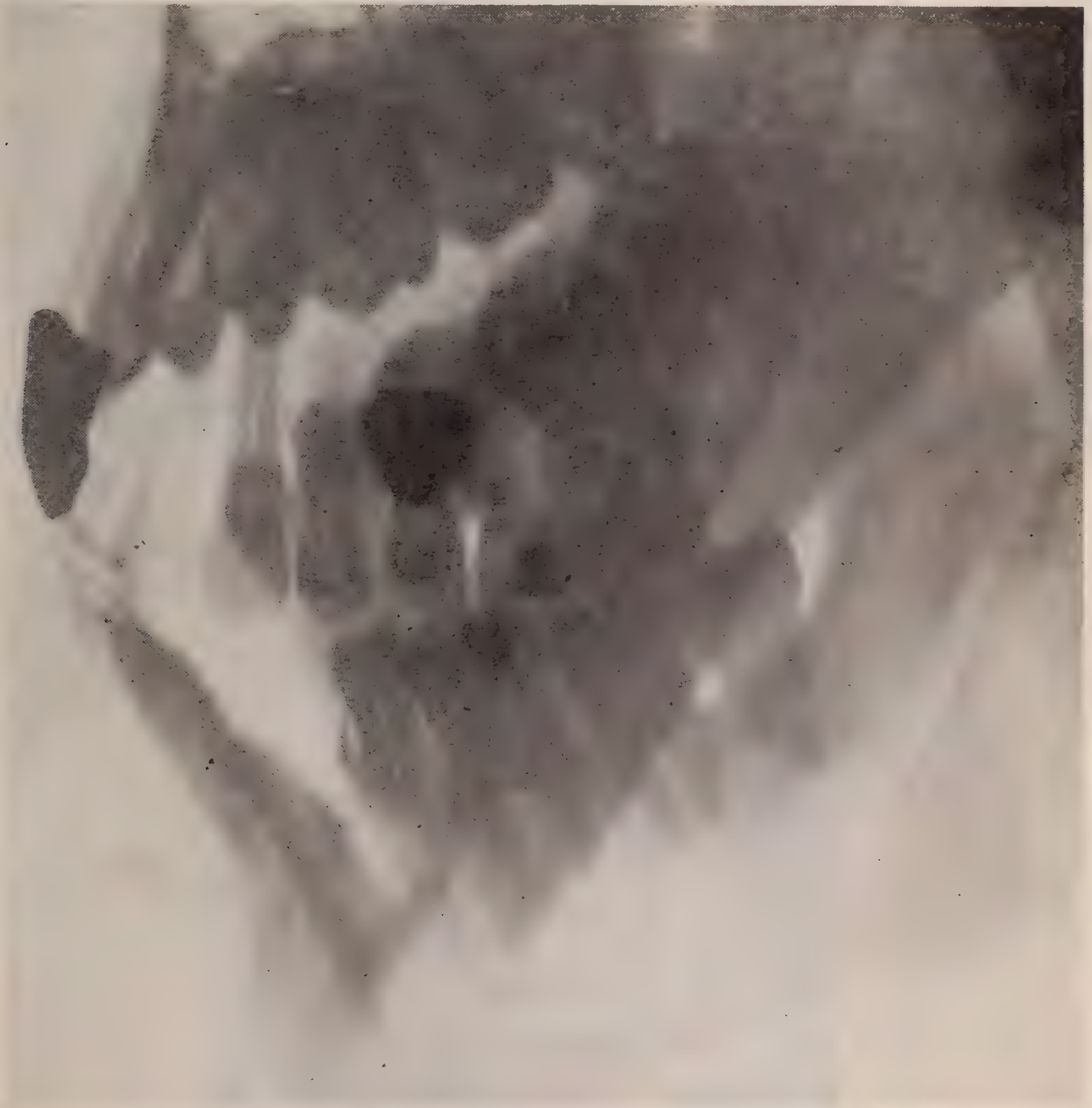

Fig. 43.

Fig. 43. (Case IX)—Roentgenogram of fracture.

LINGUAL BAR SPLINT

Case IX: A workman was struck by a piece of wood, hurled from a machine. Mandible was fractured in the region of the right cuspid and in the region of the left first bicuspid. *Fig. 43* is a Roentgenogram of the fracture taken the day of the accident, November 16, 1916, and *Fig. 44* is a photograph of the casts superimposed. Impressions were taken in modeling compound. A bridge attached to the upper right lateral, and supplying the central incisor, was completely dislodged, together with the lateral root.

All the teeth of the right side from second bicuspid posterior were displaced inward, as may be seen in *Fig. 44*. The anterior segment containing the four incisors and the left cuspid was freely movable.

The lower cast was sawed along the lines of fracture and assembled upon the upper cast, restoring the correct occlusion. *Fig. 45* is a photograph of the casts after this had been done. The upper left central, lateral and cuspid were so loose and inflamed from the blow that it was not considered wise to attempt to wire the lower anterior segment to them. It was necessary, therefore, to construct some sort of an appliance by which the anterior teeth might be held in correct position. Upon the lower cast a splint was made engaging the lingual surfaces of the teeth. Molar clamp bands were fitted to the left third molar and to the right second molar. A heavy bar of platanoid was bent to engage the lingual surfaces of the teeth. German

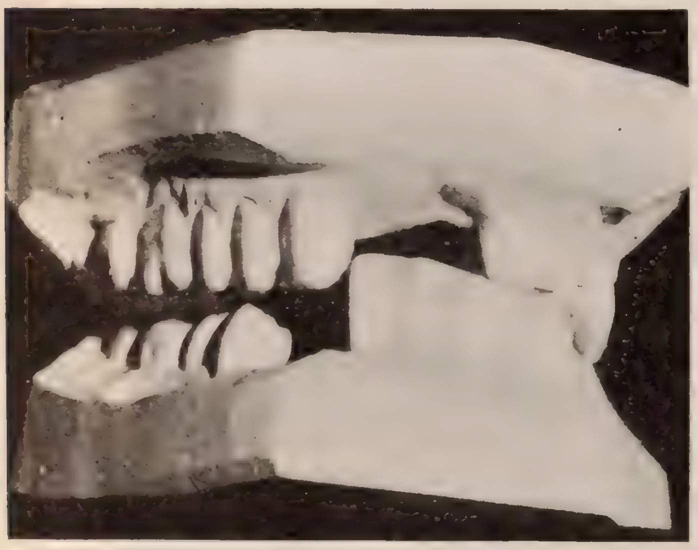

Fig. 44.

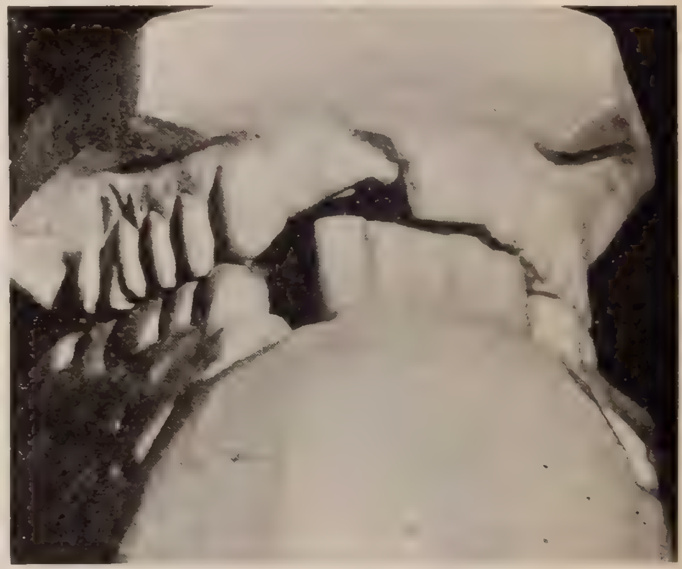

Fig. 45.

Fig. 44. (Case IX)—Casts superimposed, showing lingual displacement of right side.
Fig. 45. (Case IX)—Casts superimposed after lower had been sawed and occluded to upper.

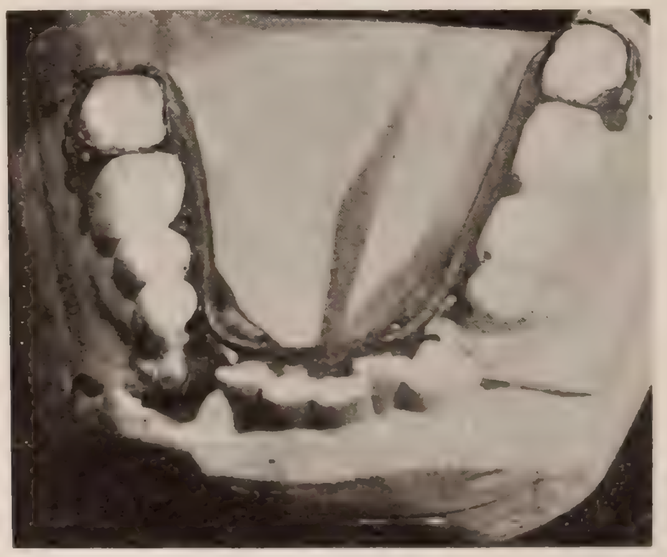

Fig. 46.

Fig. 46. (Case IX)—Lingual splint constructed.

silver banding material was burnished to the lingual surfaces of the teeth, later waxed to the platanoid bar, removed, invested and soldered with German-silver solder. At the same time the molar clamp bands were soldered to the lingual bar and it was reinforced in the region of the fracture lines. A good idea of this splint can be obtained from *Fig. 46*. Holes were then bored at different points through which wires might be passed for definitely holding the splint in position and it was then gold plated.

It was necessary to administer nitrous oxid and oxygen anesthesia to insert the lingual splint. This was done at the hospital, but the anesthetic was not entirely satisfactory and in inserting the splint the clamp band on the right second molar was broken. This is shown in *Fig. 47*, which is a Roentgenogram dated November 19, 1916, three days after the fracture. Although the molar clamp band was broken, it was possible to use sufficient wires to hold this lingual bar in place. About three of the teeth in the anterior segment were wired firmly to the splint through the holes previously made for the purpose, but after it had been inserted it was found that the teeth of the right side were not in proper occlusion. This proved that the right segment was not in correct position. Therefore, the following day, November 20, 1916, the upper and lower posterior teeth were firmly wired together, crossing the wires as shown in *Fig. 48*. It was not necessary to wire the

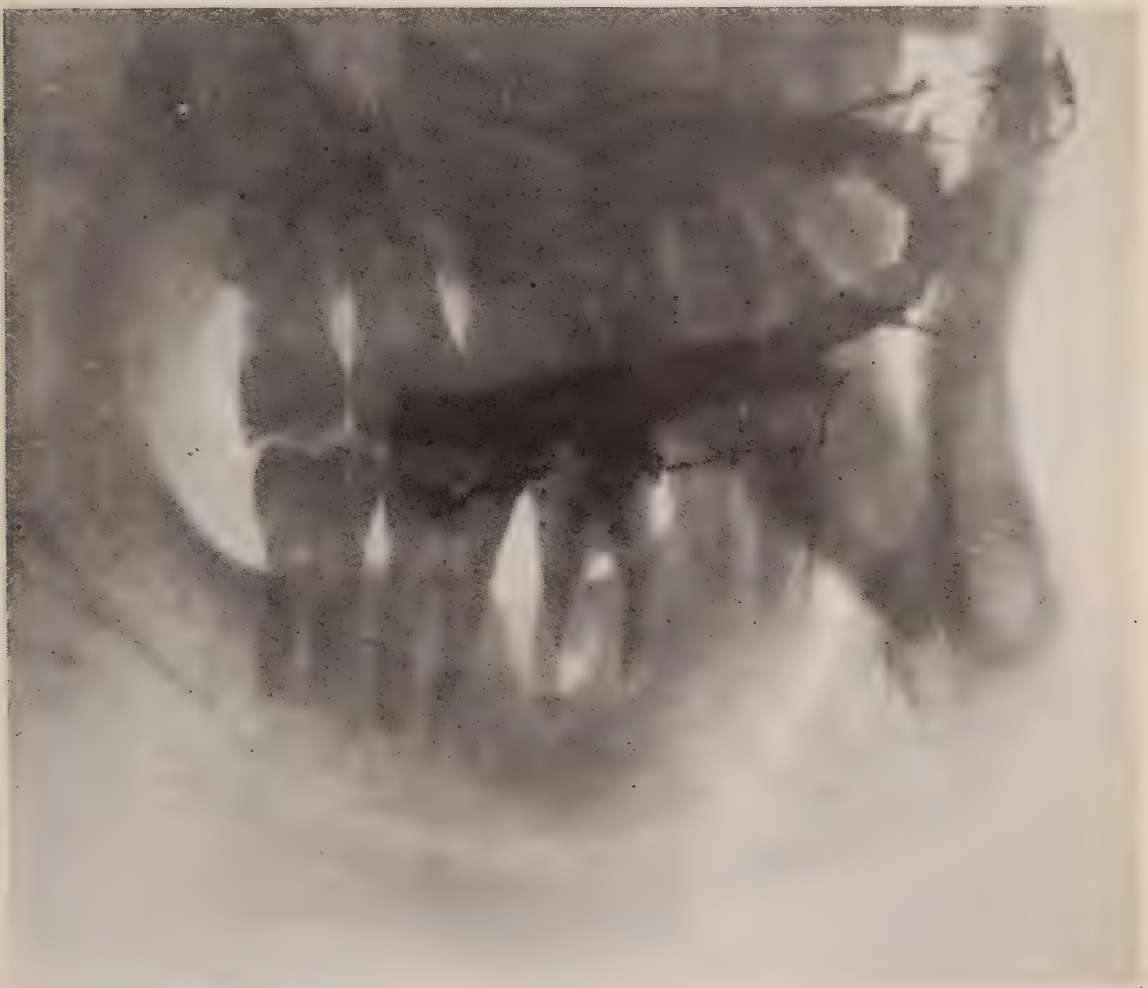

Fig. 47.

Fig. 47. (Case IX)—Splint in situ.

lower anterior segment to the upper incisors since this was wired to the lingual bar.

At the time of the accident a slight wound was made upon the right side of the face. This healed very readily and after a few days the patient was dismissed from the hospital, it being unnecessary for him to wear any sort of bandage whatsoever. Except for a slight impediment of the speech one would not have known that his jaw was fractured.

At the end of about four weeks the interdental wires were removed. It was deemed advisable at the time, however, to leave the lingual splint wired in position for another week, and on December 23, 1916, the splint was removed. The results were pleasing and satisfactory. Later on the roots of the right cuspid and of the left first bicuspid were removed and these teeth are to be restored with bridge work. Aside from a very slight scar upon the face, one would scarce know there had been a fracture of the mandible.

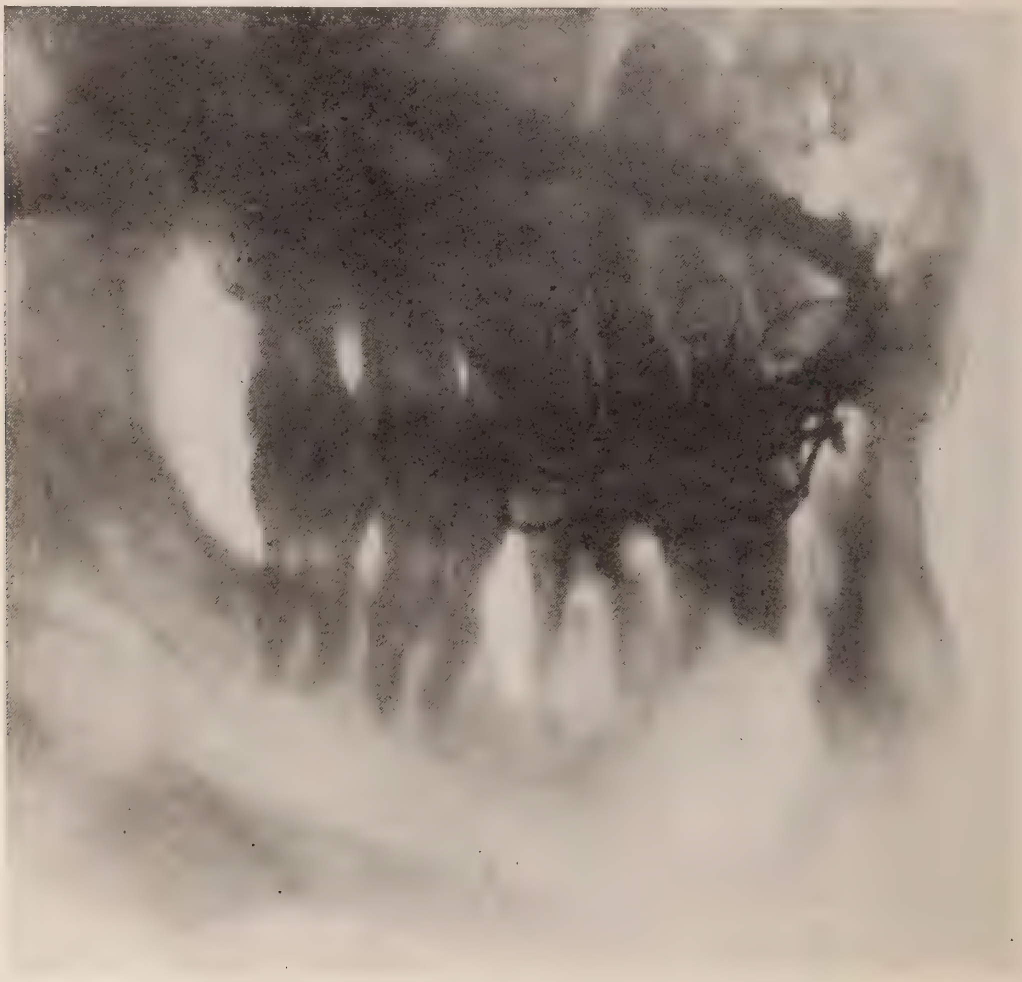

Fig. 48.

Fig. 48. (Case IX)—Splint in situ to hold anterior fragment. Interdental wires on posterior teeth.

INTERDENTAL WIRING

Case X: Patient was injured on March 14, 1917, and received no definite treatment until April 4, 1917, about three weeks later. *Fig. 49* is a Roentgenogram showing the line of fracture between the lower central

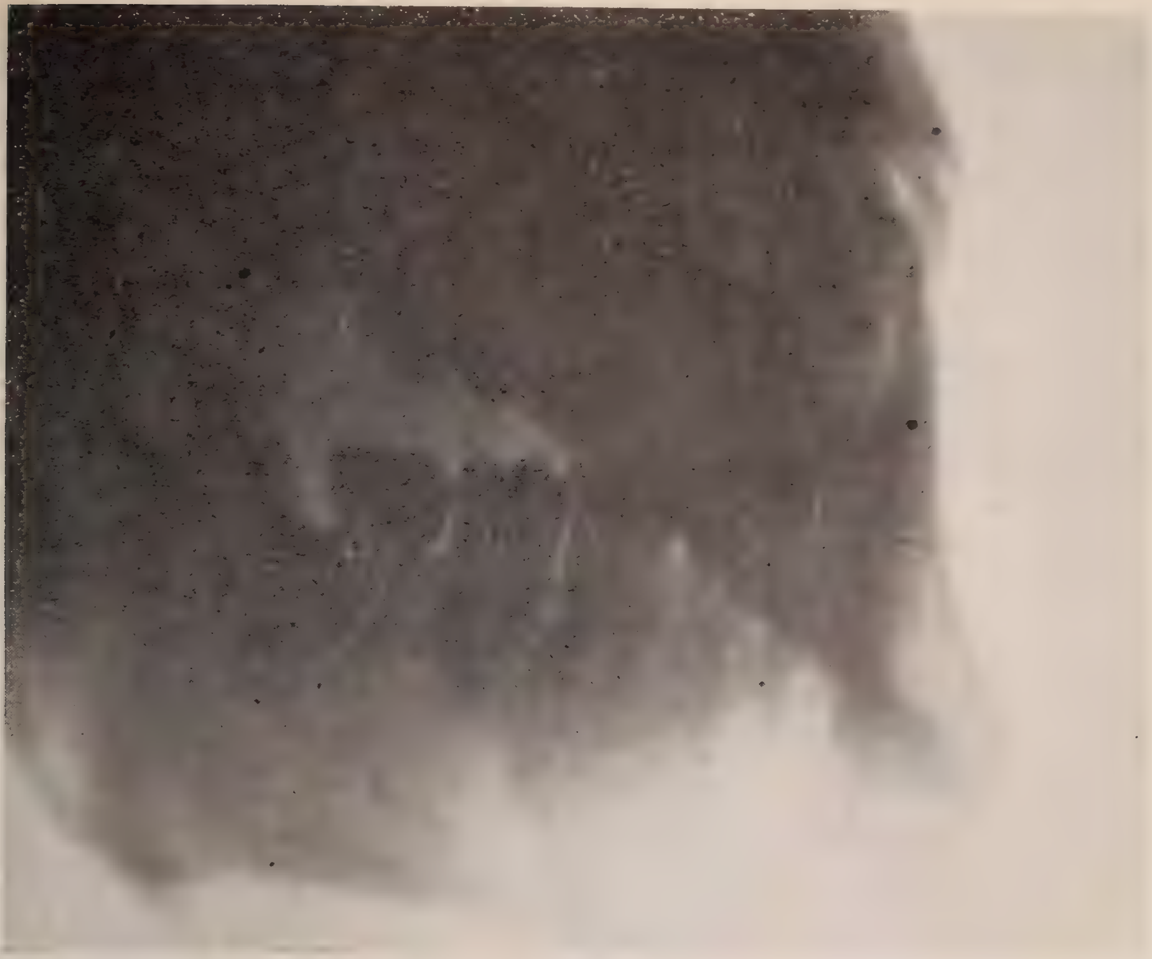

Fig. 49.

Fig. 49. (Case X)—Fracture at sympyhsis.

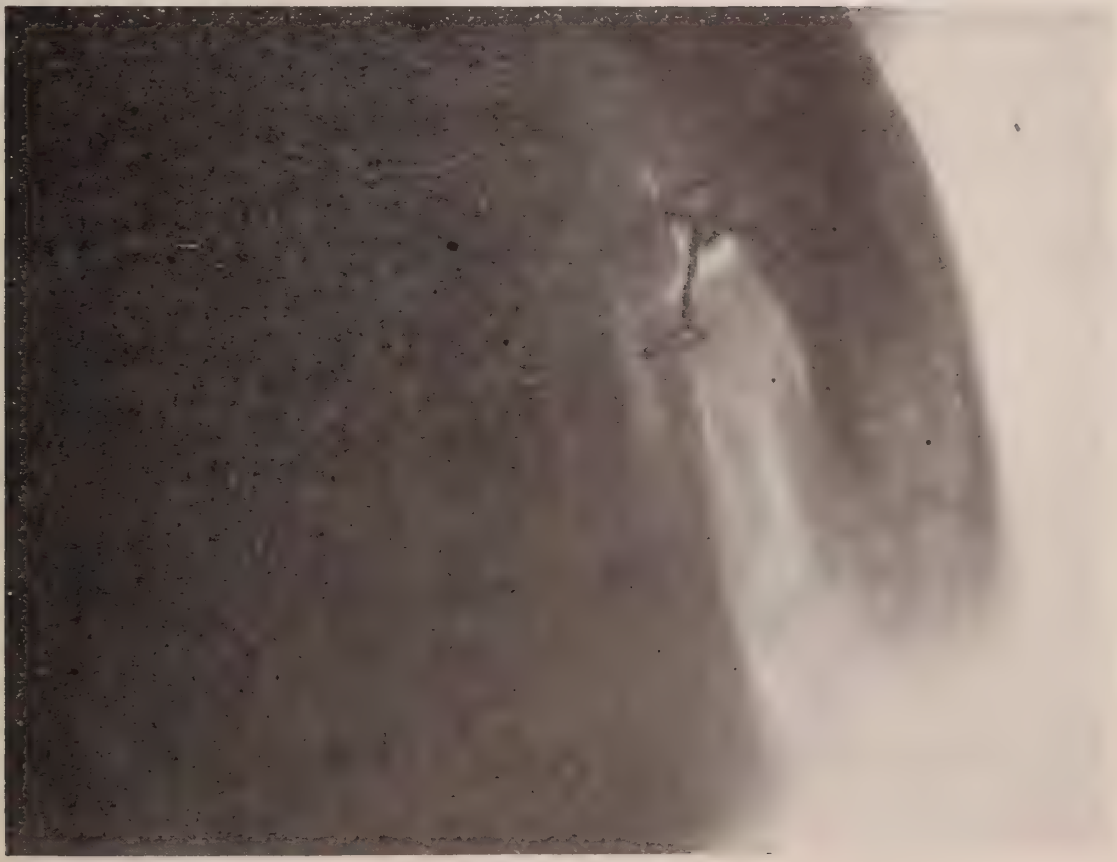

Fig. 50.

Fig. 50. (Case X)—Case wired.

incisors. In the treatment interdental wires were used. The patient had a prognathism of the lower jaw, the lower anterior teeth setting entirely anterior to the upper anterior teeth when the jaws were closed. In wiring three sets of wires were used. Upon the right side wires were crossed from the upper first molar to the lower first bicuspid and from the lower first molar to the upper first bicuspid. Anteriorly the wires were crossed from the upper right central incisor to the lower left lateral incisor and vice versa. The lower left first molar was missing and the wires were crossed between the bicuspids on that side.

This patient was a man of massive strength, his teeth having parallel axial walls, and about a week after the wires were placed they became loosened and it was necessary to replace them. *Fig. 50* is a Roentgenogram as wired the first time. The second time additional wires were used. This is a case where particularly the services of a dentist were needed in treatment. A physician might easily have misjudged the proper position of the teeth. Before the first wiring there was wide separation between the lower incisors but when the teeth were wired together this separation entirely closed and the patient very happily stated that he was sure his teeth were in the correct position.

VULCANITE SPLINT

Case XI: This unfortunate woman was thrown violently from an automobile on April 5, 1917. In addition to two compound fractures of the mandible there was also a fracture of the bridge of the nose, a fracture of the zygoma, a fracture at the base of the skull in the region of the foramen magnum, fractures of the spinous process of both the fifth and sixth cervical vertebra and a dislocation of one of the ribs. Yet a full upper denture, made twenty years before and worn at the time of the accident, was uninjured. The first two days following the accident it was expected she would die. *Fig. 51* is a Roentgenogram of the head and face which shows very clearly the fracture of the mandible upon the right side; the fracture of the left side being in the region of the first bicuspid. All of the lower teeth were absent excepting the six anteriors and the root of the right first bicuspid, which is shown in *Fig. 51*.

On April 9th a modeling composition impression was secured of the lower jaw and teeth. Better results in taking this impression could have been obtained if the patient would have submitted to an anesthetic; this she absolutely refused to do. The fracture was reduced as well and as carefully as possible and the impression taken. *Fig. 52* shows the lower cast and indicates the fracture lines.

An aluminum tray was cut to fit roughly this cast, leaving an opening through the anterior for the teeth. This aluminum tray was then perforated over the posterior part. The cast was then well oiled with vaseline and soft Kerr impression material placed into the tray was forced down upon it. This was then removed and trimmed as an ordinary lower denture. Then

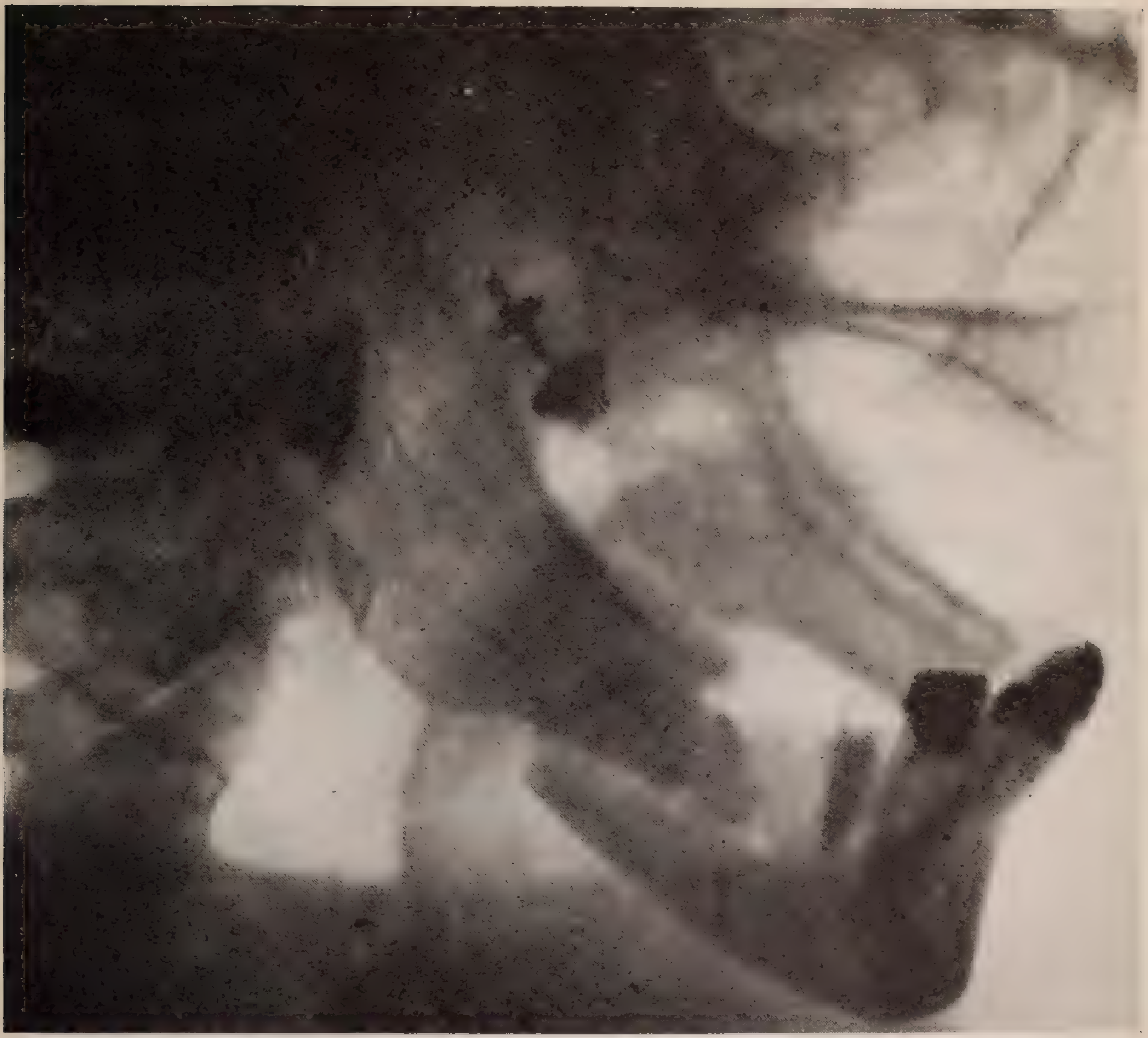

Fig. 51.

Fig. 51. (Case XI)—Roentgenogram of fracture.

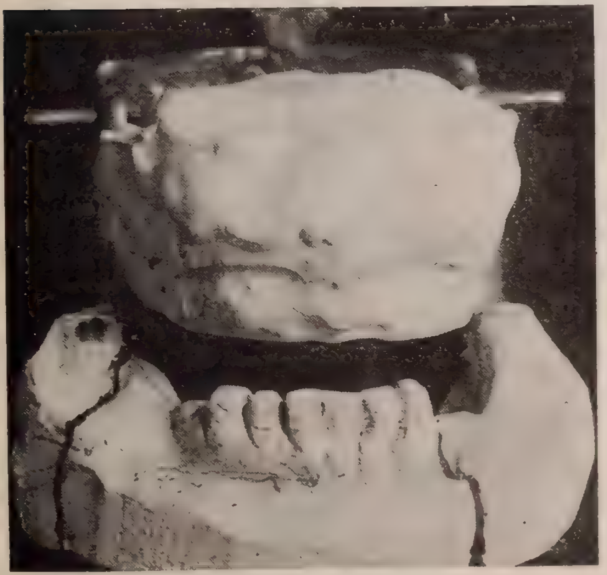

Fig. 52.

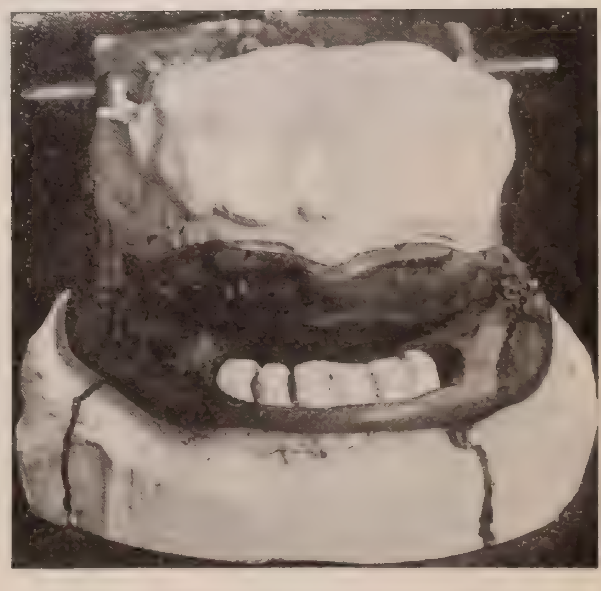

Fig. 53.

Fig. 52. (Case XI)—Casts mounted upon articulator.
Fig. 53. (Case XI)—Rubber splint ready for insertion.

to the upper surface of this splint over the posterior part considerable excess of Kerr's impression material was added. After this was softened the splint was placed in the mouth and a sort of mush-bite taken, attempting to bring the lower anterior teeth into what was judged to be about their correct position. This entire modeling compound splint was then taken out, chilled thoroughly and replaced; the patient's head was bandaged lightly and this worn from April 11 until April 13, 1916.

The splint was then removed and placed upon the lower cast, shown in *Fig. 52.* Into the impression of the upper jaw upon the upper side of the splint was placed a cast made from her full denture and both mounted upon the articulator. *Fig. 52* then shows the relative position of the upper and lower jaws as obtained by this method. A vulcanite base was then made to fit the upper cast; also one to fit the lower cast, leaving an opening for the anterior teeth. An extra ridge of rubber was made upon the posterior part of the lower and also the upper base through which holes might be bored for the purpose of wiring the two bases together. Holes also were bored in the anterior portion of the upper splint. The bases were then taken to the mouth and inserted separately for trial. A little filing of the posterior part was necessary before they finally came into the position shown in *Fig. 53.* They were then removed and wired together through the holes made for the purpose and the final insertion of the splint made.

Fortunately the left cuspid and central incisor carried ill-fitting gold crowns. Under the cervical margins of these crowns it was possible to tie strong orthodontic ligatures; these were then brought up through the anterior bar of the lower splint and tied through the holes made in the upper base. These cords drew the anterior teeth up into the lower splint and held them firmly. It was only necessary to change these cords once during the time this splint was worn. The patient absolutely refused to wear a bandage from April 15th, the time when the vulcanite splint was inserted, to April 26th, about eleven days. She made an effort to hold the splint and her jaws in proper position by placing her thumb under her chin during her waking hours.

There was very little swelling of the face externally, but there undoubtedly was an abscess on the right side at the right fracture line which discharged into the mouth. The space between the incisal edges of the lower anterior teeth and the upper vulcanite base was ample for feeding and for cleansing of the mouth. On May 14th the splint was removed, having been worn four weeks. The points where the mucous membrane had been torn and the ends of the bones exposed were entirely covered over with new and apparently healthy mucous membrane.

A Roentgenogram taken April 26th, eleven days after the insertion of the vulcanite splint, is shown in *Fig. 54.* It may be seen from this that the bones of the left side were not in good position. The apposition of the right side was fairly good. The patient absolutely refused to permit a readjustment of the splint to correct the improper position of the left side. She did, however, at that time permit the use of a bandage. It was thought that possibly the displaced fragment might be forced up into position by applying pressure over that point. Upon removal of the splint the patient felt well satisfied with the result. Although the point of the chin was not quite as prominent as it had been formerly, the deformity was not great. It would be difficult indeed to suggest a method by which the bones in a case of this kind might be held in correct apposition without surgical wiring. This method was eliminated by the patient's refusal to take an anesthetic, and after all, possibly the choice was best, for had that been done she would have carried two unsightly scars. The original upper denture was placed in the mouth after the splint was removed and although the lower teeth did not meet it as well as before the accident, the result was not unsatisfactory.

Fig. 54.

Fig. 54. (Case XI)—Roentgenogram of case with splint in situ.

About a week after the splint was removed apparently an abscess formed upon the right side. This, however, subsided without lancing, undoubtedly discharging through the mucous membrane of the mouth. Six weeks after the date of the accident the patient left for her home in another city.

SUMMARY

The knowledge gained from a very limited experience in the treatment of fractures of the mandible might be summarized as follows:

AIMS OF TREATMENT

There are three ultimate things to be accomplished in the treatment of cases of this kind. First and most important is the union of the fractured parts; second, the restoration of correct occlusion of the teeth, and third, the avoidance of facial deformities.

BONE WIRING

This method of treatment was used formerly more than now. Silver wire was used and this later removed. The objections to this method of treatment are: First, the wounds invariably become infected; second, fractured parts are not always held firmly in their correct position; third, unsightly scars upon the face, in some cases.

DENTAL APPLIANCES

Fractures of the mandible may be handled with more ease and satisfaction by the use of dental appliances.. Orthodontia bands and arches are indicated in many cases and prove a very satisfactory method of treatment. Interdental splints are especially indicated in cases where all teeth are present. Their retention by the use of a Barton bandage is satisfactory but in many cases wiring of the teeth in addition over the splint would eliminate the necessity of a bandage, and this is desirable. A little experience with splints of gold and platinum leads me to especially recommend their use. They are very easily constructed, very easily readjusted when necessary, are less bulky than splints of aluminum or vulcanite and their actual cost of construction not great considering the return of the metal. The average time consumed in the construction of a gold and platinum interdental splint probably would not exceed five or six hours.

Interdental wires are especially valuable in the treatment of cases of this nature, and particularly so when one or two teeth are missing, to permit of proper feeding of the patient. Care should be taken, however, that no solid or semi-solid material is in the stomach at the time of application of interdental wires for fear of nausea and vomiting. The result, of course, might prove disastrous.

Finally, after careful study of each case, one's own judgment must determine what is the correct method of treatment. There can be no doubt that this work properly belongs in the field of the dentist because of the mechanical skill and ingenuity demanded.

RETENTION OF TEETH

Many times teeth which it is known will be lost after treatment has been completed may be retained temporarily to serve a definite purpose. The extraction of loose or abscessed teeth, or even those directly in the line of fracture, may be a mistake because of the ingress of saliva. Often they may be retained temporarily for the purpose of holding the fractured bones in their proper position. Later on, of course, these may be removed.

HOSPITAL

Cases of fracture of the mandible may be best handled in a hospital. The patient should at least remain there for the first ten days following the accident and very often other bodily injuries make this imperative. The fact that the feeding of patients is really a serious problem at times makes it imperative that they be where the food and diet may be watched very carefully.

FEEDING

Usually liquid foods must be given. Milk, broth, soups, egg-nogs and in fact all liquid foods of a high nutritive value may be administered. In cases where interdental splints are being worn sometimes semi-solid foods may be given. During the treatment the patient generally loses a great deal in weight due to improper nourishment. In fact, a surgeon of very high standing stated that it had been his experience that it was not uncommon for patients to die because of their inability to obtain proper nourishment.

THE CARE OF THE MOUTH

Since suppuration follows in nearly every case, owing to the ingress of saliva, particular care must be given to the proper cleansing of the mouth. Compressed air spray or atomizer may be used with many mild or bland antiseptic solutions. Dobell's solution is very commonly employed. Potassium permanganate also is of high value. There could be no objection to the use of peroxid of hydrogen, not particularly for its antiseptic value, but because of its mechanical cleansing action.

SUPPURATION AND CALLUS

It is very rare for patients to recover, especially in cases of compound fracture, without formation of an abscess at the point of fracture, sometime during the course of treatment. Many times these abscesses will break into the mouth of their own accord and drain without any particular discomfort to the patient. Oftentimes they are formed and become of such size that it is necessary to lance externally. All cases should be handled in conjunction with a surgeon who may supervise this part of the treatment. Whether suppuration interferes with the formation of callus is sometimes disputed. Clinical evidence seems to show that it does not in many cases interfere materially. Possibly it forms in spite of the infection.

Callus generally forms in from four to six weeks, depending upon the age and condition of patient. When appliances are removed very often there is a slight spring or mobility of the parts. This should not give alarm, for a fibrous union has taken place and time must elapse before a hard, firm callus is formed.

10208 Euclid Ave.

CONSIDERATION OF TISSUES ACTUALLY INVOLVED IN FRACTURES AND TREATMENT OF RESULTANT INFECTIONS*

BY J. P. HENAHAN, D.D.S., CLEVELAND, OHIO

WHEN FRACTURES OCCUR they often are accompanied by wounds to the surrounding tissues. These wounds are to be considered in the treatment of the case fully as much as the fracture, which may or may not be the most serious result of the accident.

Fractures of the bones of the face and jaws and the accompanying wounds should, from the standpoint of treatment (except in some special details of technic) be considered in the same light as wounds of a like character in any other part of the body. Under similar conditions and with similar methods of treatment, the same results will be noted here as in any other part of the body.

For the purpose of description, fractures and wounds are classified according to their nature, manner in which they were inflicted, and other peculiarities. The chief subdivisions of fractures which we may see, as occurring to the bones of the face and jaws, are as follows: Simple, compound, incomplete and complete. There are many other classes of fractures which it is not necessary to consider here.

Simple Fracture is one where there is no communication between the fracture and the surface. The intervening tissues are, in this class of cases, not injured nor torn to any great extent.

Compound Fracture is one in which the soft tissue is opened in some manner, allowing outside air to come into contact with the fracture.

Incomplete Fracture is one where the bone is not completely broken.

Complete, when the bone is severed into at least two fragments.

Multiple Fracture, where there is more than one fracture.

A complete or incomplete fracture may be either simple or compound.

All of these classifications are applicable to fractures which may occur to the maxilla and mandible. Time required for the process of repair in fracture of the maxilla is five weeks, and for fracture of the mandible, six weeks, when conditions are favorable; that is, when conditions do not exist which cause delay in union of the parts.

Gun shot produces fractures of the bones according to the nature and size of the missil and the velocity with which it is traveling when it makes contact with the parts. The modern steel-jacketed bullet, traveling at a high velocity, may enter a bone and emerge, leaving only a passage to indicate its course. Under other conditions the bullet may cause a shattering of the bone into many fragments, resembling what is described in the more detailed classification of fractures as commuted.

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*Read before the Northern Ohio Dental Association, 1917.

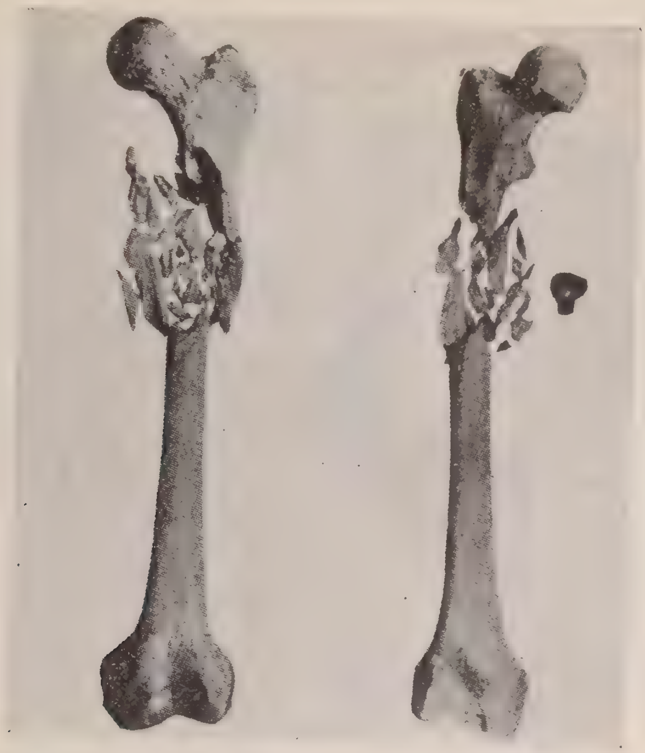

Fig. 1
Fig. 1.—Effect of gunshot at different distances.

WOUNDS

A partial subdivision of wounds according to their appearance and manner in which they are inflicted is as follows:

Incised are made with a sharp-edged object.

Lacerated: Irregularly torn, ragged edges.

Contused: Bruised underlying parts with surface not badly injured.

Under favorable conditions we may see a case of fracture, either simple or compound, make a very rapid recovery. All cases, however, do not proceed to the desired result at once for the reason that complicating conditions arise which delay the process of repair. In the case of a compound fracture, an infection may enter the wound and fracture which may result in osteomyelitis or necrosis. Either condition would not only delay or prevent repair but would cause great destruction by themselves of the parts attacked, and in the case of say, the mandible, the loss of the entire bone.

Fortunately we do not see this variety of cases often, if protective measures are resorted to early, but other conditions will manifest themselves which, while not so dangerous, nevertheless require careful and constant attention. Suppuration is a common complicating condition in fractures of the jaws. It is brought about in various ways. Fragments of bone which will not unite with the body are sequestered and pus is formed, as a result of liquefaction of the tissues, formed by nature in her efforts to cast off the useless or irritating part.

Teeth which have been injured in an accident or which, prior to the accident, were in a suppurating condition, will delay union of the parts as long as this condition is present. When pus forms, it tends for a time to collect in characteristic formations.

Abscess: If the collection is circumscribed with a defining outline or wall, it is called an abscess.

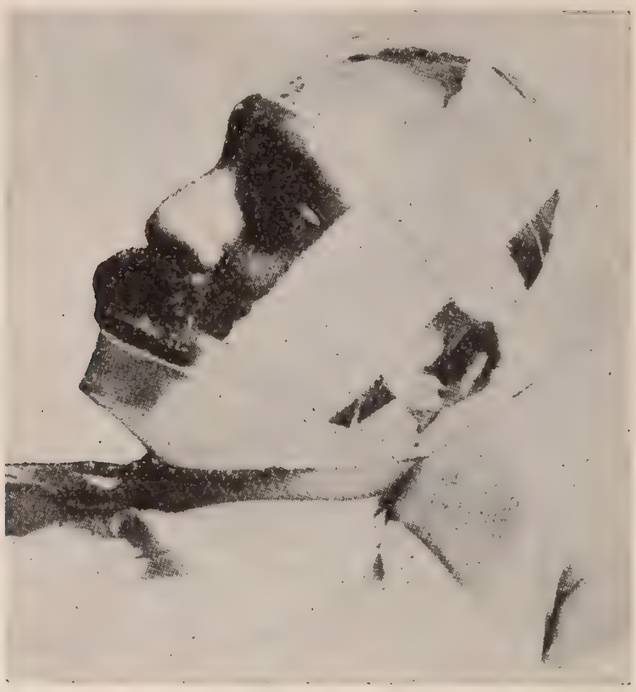

Fig. 2

Fig. 2.—Method of application of four-tail bandage.

Purulent Infiltration: If the pus burrows into deeper tissues, forming pockets, and it is not at all circumscribed, it is termed purulent infiltration, or cellulitis. When connected with a fracture this pus must be eliminated as soon as possible. If not rendered any surgical assistance, nature will form her own remedy and a passage is formed through the soft tissues to the surface, through which the pus is discharged. This should not be allowed to occur, as a disfiguring scar results when finally the healing is complete. When the necessity is evident an opening should be created with a lance. Thus we see that a fracture which originally was simple has compounded itself. The resultant drain or passage which is thus formed is called a sinus, which is the proper term for a connecting passage of this kind because it connects with a focus of infection and not a natural cavity, when it would be called a fistula. Example: Buccal fistula; saliva emitting on the outside.

Gangrene is a condition of death of the soft tissues in more or less circumscribed masses; loss of blood supply or pulpifying of tissue; infection. Treatment for gangrene is to remove all of the dead and dying tissue, being careful to leave any tissue which may form a nucleus for repair.

The treatment of fractures of the bones of the jaws consists in procuring immobolization of fragments as soon as possible and maintaining that condition until the process of repair is complete. When injuries to the soft parts require attention this should be done at the same time. Hemorrhage should be controlled by ligating of vessels if necessary, and all dirt, splinters, stones or other debris removed. If necessary the patient should be anesthetized to permit this detail to be thoroughly carried out. Soap and water should also be used when conditions indicate. All edges of wound should be drawn together and if necessary stitched; drainage must be provided for.

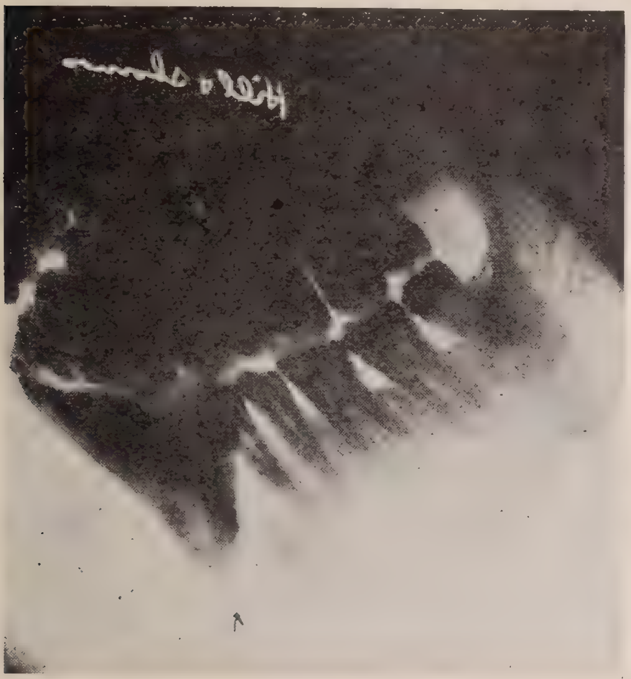

Fig. 3.

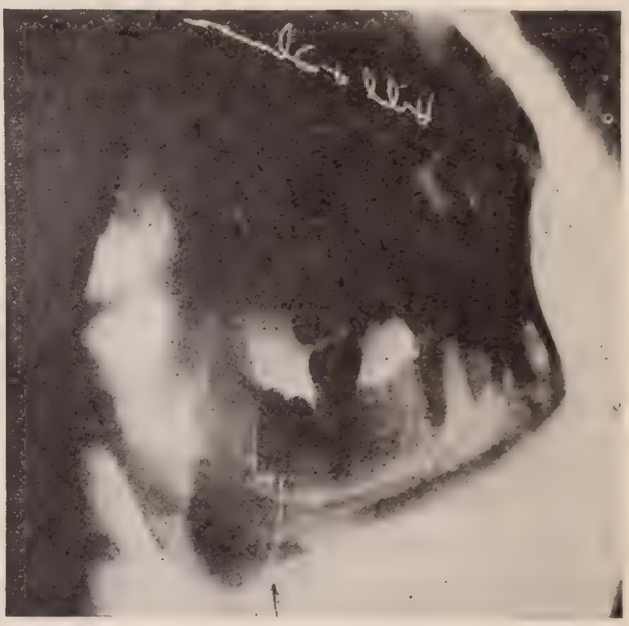

Fig. 4.

Fig. 3.—Fracture of mandible with parts not in apposition.
Fig. 4.—Fracture complicated by presence of abscessed tooth.

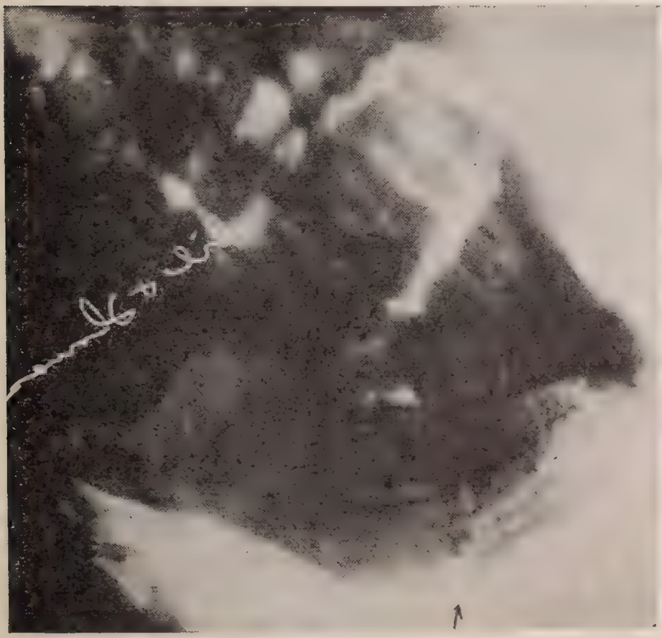

Fig. 5.

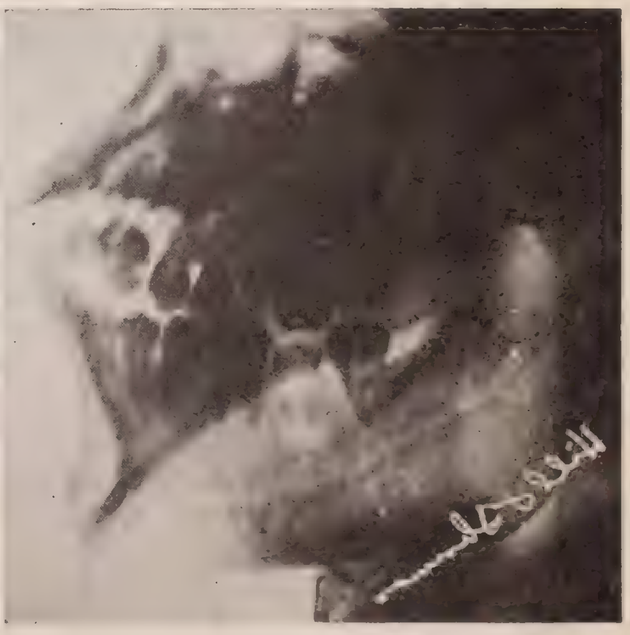

Fig. 6.

Fig. 5.—Fracture with fragments not in apposition, due to rotation caused by muscle action.
Fig. 6.—Fracture complicated by presence of unerupted third molar devitalized by accident.

Fractures will not unite in the presence of pus, so that our aim in treatment must be to eliminate all causes for its formation.

After a sinus has formed and pus continues to form, irrigation of the tract is advised. A large quantity of saline solution is first used to wash out the wound and this is followed with a bath in Buckley's solution: One part phenol, two parts tr. aconit, three parts tr. iodin, four parts glycerin; permanganate of potash (1-1000) also recommended. Ulcerative wounds should be thoroughly cleansed and a caustic applied now and then—such as nitrate of silver or zinc chlorid. These destroy the overlying sluggish granulations and stimulate the underlying ones to increased action.

Anesthesia: Wherever possible in the treatment of fracture of the jaws, conductive anesthesia should be employed, for cleansing as well as reducing the fracture. My experience has been that patients suffering this class of accidents will show various symptoms of shock. In consequence their nervous state tends to cause muscular contraction under general anesthesia, a condition which makes for destruction of your efforts. If general anesthesia is advisable, the patient should be treated with a hypodermic injection of morphine and atropine, which will, on account of the sedative action, result in muscular relaxation. Conductive anesthesia, when possible, permits of more time and attention to details, and relaxation of the muscles in the immediate region.

1023 Rose Building.

Little Lessons in Scientific Eating. By Eugene Christian. Published by Corrective Eating Society, Inc., 450 Fourth Ave., New York. Price $3.00.

There is one thing that everybody does, and that is to eat; but there is another thing that few people do, and that is to eat wisely.

These "Little Lessons in Scientific Eating" are not theoretical essays, but practical menus and instructions by which any one can at once begin to correct his eating. Some of the subjects treated are as follows: How wrong eating causes disease; how foods cure by removing the causes of disease; scientific eating explained, simplified and made practical, with sample menus; harmonious combinations of food and digestive inharmonies; how to select, combine and proportion your food according to age, with sample menus; how to select food according to occupation and season ot the year, with sample menus; obesity, cause and cure, sample menus; emaciation, cause and cure, sample menus; the business man—right and wrong way of living—sample menus; method of measuring food values; food and morality; tea, coffee, liquor, etc.—scientific reasons why people should not use them; superacidity, fermentation, gastric catarrh and ulcer, auto-intoxication—causes, results and treatment; what to eat and what to omit; constipation—cause and cure; nervousness—cause and cure; corrective menus for each season of the year; diagnosis simplified and made practical.

Twenty-four "little lessons" told in a simple, thoughtful, forceful way, containing sound reasoning and good advice.

THE RETENTION OF DEVITALIZED TEETH WITHOUT DANGER OF FOCAL INFECTION*

BY M. L. RHEIN, M.D., D.D.S., NEW YORK

LECTURER ON DENTAL PATHOLOGY, DEPARTMENT OF DENTISTRY, UNIVERSITY OF PENNSYLVANIA

THE ACCUMULATED EVIDENCE both in research work and from clinical data has established the fact that many infective lesions of vital parts of the body can be traced to focal infections at the ends of the roots of teeth. The great amount of attention that has been brought to this important subject has resulted in the usual exaggeration, not only by the laity, but by many physicians. Consequently it is timely that it should be made very clear that all cases of endocarditis, arthritis, ulcers of the stomach, etc., are not of dental origin.

The value of the natural teeth in the maintenance of health should not be overlooked, and they should not be extracted in a wholesale manner on insufficient evidence of their being a menace to life.

It should be understood that the evidence of a Roentgenogram requires corroboration, that poor Roentgenograms are apt to be most common, and that a picture in which the tissues cannot be histologically studied is unreliable.

The correct reading of such a picture for the purpose of making such a diagnosis is dependent on the definition and detail of root, alveolar process and lining membranes being absolutely clear. Even then it may be necessary to obtain other pictures at varying angles, and finally only a man thoroughly familiar with the histologic appearance of these tissues is capable of a fair interpretation of the same. Even when a Roentgenogram has demonstrated the presence of focal infection in the alveolus, it does not prove it to be the etiologic factor sought for. On the other hand, it may be a contributory cause together with some other focal infection.

Too little attention in this period of quick action is being given to the making of a differential diagnosis. In this respect the value of the *streptococcus viridans* complement fixation test is worthy of serious attention. In view of the fact that more than one hundred and fifty strains of this group have so far been isolated, we must bear in mind that if it has a value, a negative result is by no means conclusive that a later test with some new strain may not show a positive fixation. I am firmly convinced from corroborating clinical evidence that the test has a certain diagnostic value. When a positive result is obtained there remains the self-evident fact of the value of an autogenous vaccine from this source.

Whenever a diagnosis of a focal infection at the end of a root has been made we must give due consideration to the question of immunity. The transitory character of immunity must never be forgotten, just as we must remember how much we still have to learn about immunology. Consequently it follows naturally from this that given a focal infection in the alveolar region, it must, as a question of prophylaxis, be cured or the tooth should be extracted.

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*Read before the Section on Stomatology (A. M. A.) of which THE DENTAL SUMMARY is the representative organ for the dental profession.

Where corroborative evidence points to this pathologic site being the cause of metastatic disturbances of a serious nature, it should prompt the cure of the infection as rapidly as possible. In such cases immediate extraction of the diseased tooth is frequently made necessary on account of the time required to eradicate such an infection and leave the tooth in a condition free from the danger of reinfection.

On the contrary, where no metastasis is discovered it leaves the dentist ample time to attempt to properly preserve such a diseased tooth.

Perhaps the greatest reason why this operation is done so imperfectly, even at the present time, by very capable men, is on account of the fact that in the majority of cases it is one of the most difficult of operations and often requires many hours of patient labor divided into different periods of time. This is due to the fact that in so many cases calcification has blocked the root canals, and it makes no difference how extensive this calcification has become, it is essential that every canal must be explored until a broach can pass through the foramen. This can only be accomplished by Roentgen-ray checking at every stage of the operation. It is most difficult to have the average operator understand that certain definite results must be attained regardless of time consumed.

I have been frequently criticised for the length of time I have taken in certain cases, but would state here that perhaps these men, many of them thoroughly conscientious, would think further if they could see some of their failures that had been rectified, failures that were due entirely to their unwillingness to take the time necessary to explore canals to their end. The great expense, necessitated by the amount of time consumed, prohibits the operation in a great many cases. Too many men are easing their conscience by doing better work than formerly, and yet not obtaining correct results. This, however, should not suffice any longer; the principles are now understood, the Roentgen-ray reveals the result, and if we make any pretense to honesty we must cease allowing imperfect root-canal work to remain in the mouths of people who leave the dentist deluded into thinking that the disease has been eradicated. Remember, after all has been said, that our first duty is not to ourselves, not to our colleagues, but to the community at large.

With this understanding let us consider the principles, technic and final result to be attained.

The first thing to remember is that every step and stage of our work must be done under the most thorough aseptic surroundings. The mouth should be thoroughly sprayed at the outset of every sitting. The gingival border of the root to be operated on should be painted with iodin and the rubber dam should invariably be applied.

It is not feasible here to elaborate the varying details of removing pulp tissue from roots that deviate from the normal type and that exhibit different pathologic characteristics. Let it suffice at this time to say that every particle of organic pulp tissue must be removed, however intricate and tortuous the canals may be; all bay-like recesses and divergent canals must be cleared of organic matter. Unless this can be accomplished it is useless to proceed further.

When it is desired to make a complement fixation test, the utmost care in the way of asepsis should be taken in regard to the removal of pulp tissue. No chemicals of any kind can be employed on account of the danger of destroying any existing bacteria. When the Roentgenogram shows that a sterile broach can be passed through the foramen, a fine irido-platinum wire previously heated is passed through the foramen and turned around a number of times in the periapical region. This is now withdrawn with care so that the inoculated wire should come in contact with nothing prior to passing into an agar-agar tube, or better still, in a sterile broth tube. The carefulness of our technic alone will determine the value of the culture produced.

The therapeutic agents used to remove pulp tissue are the sodium and potassium alloy and dilute sulphuric acid. No therapeutic agent should be used in the canal which will affect any pathologic condition, which might otherwise interfere with a correct diagnosis. This especially precludes the use of all preservatives such as creosote or the phenols, which will in addition prevent an ideal hermetical sealing of the canals at a later stage.

The galvanic current is now brought into use for the purpose of zinc ionization. Without going into the details of ionic therapeutics, it can safely be said that all of the infected area can be made sterile in this way. It is all dependent on the amount of ionization used. Where there is any uncertainty as to periapical sterility, it should be determined by taking a culture from this area, which should show absolute sterility. This necessarily means a delay of at least ten days when, if no culture has shown, the part should be again sterilized prior to sealing the canal. So far no investigation has shown how long such an area will remain sterile. Until this has been definitely solved, it is important that the root-canal sealing should immediately follow the last ionization of a given part. In multi-rooted teeth the ionization should be carried on through each separate canal, which should immediately be filled before another one has been ionized.

Every step having been so far satisfactorily carried out, we reach the final and most important stage of the operation, that of the root canal-filling. This material should be non-irritating, unchangeable in character, and should so homogeneously and hermetically seal the interior of the canal as to safeguard against any infection through the tubuli from the cementum. Its most important function, however, is to seal the outside of the end of the root against two important factors. The first one is to defend the slightest opening of a foramen against the invasion of bacteria. The second, and equally important factor, is to hermetically seal any exposed surface of cementum or dentin against osteoclastic invasion.

The encapsulation of the end of the root with gutta percha accomplishes both of these purposes. No stage of the operation requires so ideal a maintenance of asepsis.

The proof that such an operation as above described will eradicate the disease consists in the fact that this granuloma area disappears and is replaced by new alveolar structure.

Anything that interferes with the success of these steps is liable to make the operation a failure.

The most common cause of a failure among the men skillful in this operation is an imperfect encapsulation, which oftentimes cannot be detected until it is discovered that the new bone has not regenerated.

It does happen that regeneration of bone proceeds for a given time, perhaps for a year, and then on account of imperfect encapsulation, a new infection has started up, showing by evidence of new rarefaction; or absorption of the root starts in at some point because there has been an exposed point of cementum not sealed by gutta percha.

On this account it is both unwise and not safe to be positive of success until the part has been under Roentgenographic observation for a couple of years. Patients should be instructed to come back for these pictures at least every six months until assured that the new bone is a permanent addition.

If it is found impossible to effect the permanent regeneration of new bone in this way, there still remains a final operation by means of which the root may be maintained in a healthy manner.

The amputation of the diseased end of the root and thorough curettment of the periapical region has become a well-recognized procedure, but should be a measure of last resort.

Many apicœctomies brilliantly done eventually turn out failures, because of root absorption due to the action of iconoclasts on the exposed cementum or dentin on the stump of the root.

This should be obviated by permanently insulating this dentin surface from the body tissues. This has been done in the past by an amalgam filling over the stump, which entirely covers it. An easier method and one more compatible to human tissue is to dry the surface of the stump and cover it with a few coats of a chloroform solution of gutta percha. The rapid volatilization of the chloroform produces a dehydration of the surface and the gutta percha is left firmly glued to the end of the root.

Of course, the same follow-up Roentgenograms must be taken after this operation. When none of these methods produce permanent alveolar regeneration it becomes our duty to see that the tooth in question is extracted.

38 East Sixty-first Street.

DISCUSSION

Dr. M. I. Schamberg, New York: It is evident that an immense amount of work is being done to clarify the atmosphere as far as focal infections are concerned. I fear that too little attention has been given to the areas of infection that occur in the mouth that do not show in Roentgenograms; in other words, where teeth are pulpless and show no evidence of infection at the end until they are removed and the tips of the roots snipped off and cultured. The same thing applies to the cases of incipient gingivitis which have not really reached the stage of having become definite cases of pyorrhea; cases in which there is no pus discharge, but in which there is, however, a breeding space for the lodgment of organisms that are a menace to the health. The mouth is definitely the slum district of the body, and in that mouth we have all the criminal organizations that tend to invade the system, and produce the havoc that we have heard so much about. In spite of excellent work done by Dr. Rhein and his followers, I am inclined to favor only a more definite method of curing apical infections—that the vast majority of practitioners be not permitted to deal with pulpless teeth. I believe that at least seventy-five per cent. are failures, in spite of all that we have learned, and these conditions are a great menace to the health where they are directly or indirectly responsible for the numerous secondary involvements.

Dr. T. W. Brophy, Chicago: The most essential step to be taken in the prevention of these diseases is the training of parents as to hygienic methods. When the time arrives, Dr. Atkinson used to say, that the members of the profession and the public are brought to realize the serious consequence of dental caries, and its sequelæ, then we will have arrived at a time when these diseases will be less numerous. I was further impressed with the feeling that the class of infections that have been discussed constitute a class of infections and diseases that has not received the attention that its importance demands on the part of medical teachers. One of the greatest difficulties with which I have had to contend is to find that interns, who are among the best educated of the medical graduates, have never had instruction, with few exceptions, on the diseases incident to the teeth; when they come in touch with these maladies they are not qualified to make a diagnosis or to express an intelligent opinion as to the best course to pursue in the management of their patients.

Dr. Louis Goldstine, New York: I have been dealing with chronic conditions in cases that have gone a little too far for the dental man to do much good. I have examined hundreds of Roentgenograms in trying to see the percentage of infections in these chronic cases relative to the cases of healthy persons, and I find that in the 200 or 300 cases that I have gone over, about ninety-five per cent. of the arthritis patients have two or three abscesses in their mouths, and I think we will find this in cardiacs as well. Of course, in these cases little can be done by clearing up the abscesses to cure the conditions, as the arthritic conditions are beyond redemption.

Dr. Frederick B. Moorehead, Chicago: There are certain fundamental facts that we must all face in this whole question. First, the fact of focal infections as an established truth in pathology; second, the incidence of chronic mouth infections, in relation to general infections; third, we must all agree that any infection, wherever found, should be removed. These are postulates which we must accept as a working basis. Now, the question arises, how shall this be done? For the most part by the extraction of teeth.

Dr. Rhein has indicated the possibility in the hands of an expert of saving a few teeth. He failed to tell us how many times he fails to do the thing he showed us on the screen this morning. I know he has a good percentage of failures, and he removes the teeth when treatment fails. An expert giving a lot of time in saving a few teeth does not determine an average for the profession. I am perfectly willing to admit that where teeth can be handled by a man as expert as Dr. Rhein, badly-infected teeth may be saved in many cases. A specialist has many advantages over the general practitioner, both in opportunity and the class of patients who come to him. Where the patient's health is not put in jeopardy, while infected teeth are being treated, and where the case is carefully checked up by the Roentgen-ray, no one has any complaint to make; one may develop a highly-specialized technic in root-canal management if he is willing to give thought and attention to it; but how many have developed such skill? Not many! How many people are there who may be served by that type of men? What about the great population of foreigners? What about the poor? What about the people who are bedridden in our hospitals? what about people suffering from general chronic infections? Are we going to subject them to any detailed regime? Certainly not. Reduced to fundamental facts, it becomes evident, after all, that, for the most part, teeth that are badly involved in chronic infections will have to be extracted.

Dr. Arthur Zentler, New York: After what we have seen, what right have we to believe that in spite of good technic we will have no infection around the apex of these roots?

Dr. Meyer L. Rhein, New York: I am in thorough sympathy with what Dr. Moorehead has so well said in a general way, except that I think he goes a little to extremes. I think he overestimates the lack of men who are doing good root-canal work at present. I know that personally I have trained and educated over two hundred men in this very district that we reside in, who are doing first-class root-canal work. There is a great deal that he has said, however, that it is not thought advisable to debate on. I would especially refer to the difference, the unwillingness of a man, after he has spent two hours, or twenty hours, on a good tooth—and that has happened many times with me—then to tell the patient that the operation is a failure and that the tooth must be removed. That is the difficult point to make the dentist understand. It is a simple thing with the surgeon, and his confrere, the physician. Dentists have been brought up to look at these things as jobs, mechanical jobs; and they are afraid to tell their patients that the operation is a failure and that in the interest of their health the tooth must be removed. That is the point I want to emphasize in regard to what Dr. Moorehead has said.

I was disappointed not to hear from Dr. Goldstine on remedial efforts by means of extraction in some of these cases. This is a criticism against the institution with which he is connected. I have discussed that question with the managers of institutions many times, and found it difficult to resort to extraction because they had no money at their disposal to supply patients afterwards with artificial teeth. I have a long history of arthritis cases of many years' standing, many of them as bad as Dr. Goldstine will find in his institution, in which the patients have been absolutely cured by the removal of every focal infection in their mouths. This is no criticism of the gentleman; I am simply making it broadly against the lack of means that these institutions have for the completion of such an effort.

Dr. Kurt H. Thoma, Boston: I am connected with an institution which deals with chronic infectious cases, and most of the patients suffer from chronic arthritis of long standing. Our hospital is in a position to give these patients the very best attention in all respects.

From the beginning I have practiced radical extraction of all abscessed teeth, and in order to restore the patient's masticating efficiency, which is, of course, of great importance, we have a dental intern who supplies plate and bridge work after the extractions.

The dental department of the hospital has existed for about two years and in looking back on the many cases under our observation, we find that we did not get the results which we first expected. We thought we would cure a large percentage of the patients and, although we have not done this, we find improvement in many cases. The acute symptoms of pain and swelling have improved, but they have not been entirely corrected. This is due to the fact that the destruction in the joint, or other part, where the infection is located, has progressed to such an extent that anatomic restoration is impossible. However, we do look for improvement of a more physiologic nature. The purpose of correcting abscessed teeth, infected tonsils and intestinal disorders is to improve the patient's general condition and from this and improved nutrition, in which masticating efficiency plays an important part, we expect improvement of the chronic disease. We find that we are able to put the patient in a condition which, though not ideal, enables him to do some kind of work to a limited extent, thus making a self-supporter out of a man who would otherwise be a burden to the community.

Dr. T. W. Brophy, Chicago: Dr. Thoma, in removing the teeth about the ends of the roots of which you have an abscess, what do you accomplish by that?

Dr. Thoma: After I remove the tooth I get rid of the infection.

Dr. Brophy: Well, the bone is affected, is it not?

Dr. Thoma: Of course by removal of teeth I mean not only extraction of the tooth, but all that goes with it, the curetting of the cavity, and the treatment of the wound until it is thoroughly healed.

Dr. Brophy: Curetting of the cavity ought to be brought out.

Dr. Thoma: I both extract the tooth and curette the cavity in every case.

GOLDEN JUBILEE MEETING TENNESSEE STATE DENTAL ASSOCIATION

THE FIFTIETH ANNIVERSARY meeting of the Tennessee State Dental Association, held in Memphis, June 19-22, 1917, was acknowledged to be the best meeting ever held by this society. From first to last there was something of interest and value being presented by capable men. It was the kind of high-grade program that any state society could pattern after with great profit to its members. And the banquet was one of the most delightful affairs of the kind that it has ever been our good fortune to attend.

At the opening session of the association, after invocation by Rev. C. H. Williamson, an address of welcome from the city of Memphis was given by Mr. W. C. Johnson, president of the Chamber of Commerce. Among other things Mr. Johnson said:

"It is not only my pleasure but a very great honor this afternoon to welcome your society to our city. I cannot think of any body of men we would more gladly welcome. You men and women stand as men and women who have accomplished things in your chosen line. It is unnecessary for me to tell you of the enormous strides that dentistry has made in the last few years. I believe that is known to every one who is at all alert, and of course is known to you best of all. And yet I believe you will admit that you are even now just in your beginnings. Dentists are not yet used in the making of diagnoses as they should be, and as they inevitably will be.

"Just at this time when all eyes are turned toward our navy and our army, I believe your work is of tremendous importance. There should be the most careful examination of all men for the different branches of our service, and there should be, in connection with the medical work in our hospitals, the very closest co-operation between the physicians and the dentists. In that way only will our country be best served. Our country is calling to all of us in this time of its need and, judging from what you men have done in the past, I know that you will give to the country your very best talent and effort.

"I again want to welcome you to Memphis, on behalf of our business men and on behalf of our people generally. We are glad you have come, and we want you to stay just as long as you can." (Applause.)

THE PRESIDENT: The next speaker will be Dr. C. J. Washington, of Memphis, who will welcome us on behalf of the profession of the city:

Dr. Washington said in part: "I feel that it is almost a waste of your time for me to take any of it in telling you that you are welcome to Memphis, as far as the dental profession of the city is concerned. We, indeed, extend to you the most hearty and cordial welcome. We appreciate that you have conferred an honor not only upon the city but upon the dental profession as well in holding your fiftieth anniversary meeting with us. To you men from the other parts of the state we want to say that we esteem it a high privilege to entertain you during these sessions.

"The dental profession, perhaps above almost any other, I believe, realizes the part we must play in the work of the world generally, and especially now in connection with our war preparations. We must all stand behind the President of the United States, give him our fullest support and co-operation, and I know I speak for every dentist in this great society when I say that that support and co-operation will be by most of them most unstintingly given. (Applause.)

"We, the dental profession of the city of Memphis, thank you for coming here for this great Golden Jubilee, and we want you to know that you are most thoroughly welcome."

THE PRESIDENT: The response from visitors will be given by our affable friend, Dr. Burton Lee Thorpe, of St. Louis, Mo.:

DR. THORPE: "It is with genuine pleasure I visit Tennessee again. This is my seventh visit to this state to attend a dental function, and I always look forward with delight at the opportunity, for well I know the charm of your welcome and your hospitality.

"One regret is, I am not a native son, but I did the next best thing—married a Tennessee girl; God bless her. (Applause.)

"I thank you, Mr. Mayor and Dr. Washington, in behalf of your visitors, for your cordial and sincere words of welcome.

"Dr. Washington, you know, is a descendant of the immortal George, of whom a school boy's definition is apt: 'George Washington married Martha Curtis and then became the father of his country.' (Laughter.)

"I doubt if many of you know the real reason why George Washington could not tell a lie. It is this: George wore a crude and ill-fitting set of teeth; every time he started to tell a lie the upper fell down and stopped his speech, because the suction was so poor. (Laughter.)

"This is the fiftieth anniversary of the organization of this society that has done so much in the educational propaganda of dental surgery and if I recall my history aright, this soceity was organized in the office of William Henry Morgan, who presided at that meeting as chairman of organization, and was elected the society's first, and again in 1886, its nineteenth president. All of the charter members have passed on to their reward, but there is one man here today who was present at the organization. That is Henry W. Morgan, who, fifty years ago, was a ten-year old boy playing in his father's office the day this society was organized. (Applause.)

"I often think of the career of Wm. Henry Morgan and the great work he did for our profession, not only in this state and in organizing the dental department of Vanderbilt University, of which he was a teacher and dean for twenty-one years, but also in the American Dental Association, of which he was one of the organizers and president in 1870. Wm. Henry Morgan was a rugged country boy living near Russellville, Ky. Fired with ambition for dental knowledge, he left his home on horseback, rode to Bowling Green, where he took a stage to Louisville. At Louisville he took the steamboat and went up the Ohio River to Pittsburgh Landing. From Pittsburgh Landing he went by stage to Cumberland, Md.; he then took the western terminus of the Baltimore & Ohio Railroad. Here he boarded the train for Baltimore, never having seen one before. During the winter while attending the Baltimore College of Dental Surgery, he occupied a very modest attic room and, lacking funds, did without fire, not expecting to graduate. But the character of his gold fillings attracted the attention first of Dr. Thos. E. Bond, and then of Dr. Chapin A. Harris, the dean, and he was notified to come up for graduation. He wrote his thesis, which his roommate corrected, and received his diploma granting his dental degree in March, 1848, and soon afterward started back home, retracing the trip he made to Baltimore.

"He had but little money to spend during the winter, and this fact was well known to his classmates. While on the boat on the homeward journey the three or four with him made a common pot, one day, in the middle of a table, of all they had; then each took enough to take him home, and what was left was to be young Morgan's share, as he had the longest journey to make. He had just enough to land at the wharf, where he found an accommodating neighbor with an empty tobacco wagon who loaned him a mule from the team and a saddle, and hauled his trunk, which contained what clothes, books and such instruments he had accumulated, home. He at once began practice on his return to Russellville. where his success was most flattering. While on a visit to Nashville to make an arrangement by which he could get gold foil more conveniently, he made the acquaintance of Dr. T. D. Hamlin, the only Tennessee dentist of that day, who urged him to locate in Nashville and become his partner. This he did, continuing the connection for ten years.

"In the day of Dr. Morgan's coming to Nashville, Mr. S. M. Scott, my father-in-law, then resided there, and he has often told me of Dr. Morgan's skill and standing as a citizen and of his possessing that most important asset for any young man to have—character.

"Tennessee dentists have had a prominent part in dental affairs in the past. J. Y. Crawford was twice president of the American Dental Association, 1894-5, and president of the Southern Dental Association in 1889. L. G. Noel, in 1902, was president of the National Dental Association, as also was A. R. Melendy, in 1911. All of these served with credit to themselves and honor to the profession.

"Another Tennesseeian none of us who knew will forget is F. A. Shotwell, who for years attended the national meetings always clad in his Confederate grey clothes. When Lee surrendered, Dr. Shotwell said he never would wear any clothes except his beloved grey, and I am told he never did, except once at Niagara Falls, in 1901, he exchanged clothes with his G. A. R. friend, Chas. C. Chittenden, who wore the Federal blue, and it was a happy pair they made dressed in a uniform not theirs in war time; but time, that great eliminator, made them comrades indeed in time of peace. (Applause.)

"We all heartily endorse the patriotic sentiments uttered here today and we all should be proud of the part our profession has taken in this great war, especially in the making whole and sanitary the mouths of recruits for the American army, so nobly fostered by the campaign conducted by the Preparedness League of American Dentists. (Applause.)

"I admire the present spirit of patriotism shown here today by you whose fathers and grandfathers followed the tattered 'Stars and Bars' of Civil War time. It's beautiful to know your loyalty to that glorious emblem, 'The Stars and Stripes.' (Applause.)

"You who have met the Tennesseeian on his native heath as I have, will join me in my belief that:

"In Tennessee,
It seems to me, the sky's more blue,
The birds sing sweeter and the air's rarer too;
The moonlight is mellower, the corn juice yellower,
Wives more beautiful, husbands most dutiful;
Babies come oftener, and flattery is the greatest softener
In Tennessee."

. Then followed the regular papers and lectures, which will be published separately in this and future issues of THE DENTAL SUMMARY.

Some funny stories are told by the English recruiting officers. A man who passed the Board was asked how he passed the recruiting officer minus every tooth in his head, said he had hired a set for the afternoon at a cost of one shilling, as his pal had joined up and he didn't want to be left. Another who was rejected by the recruiting officer said he couldn't understand why, as his brother had been passed with the same set of teeth only the day before.

An old lady went to the office and made an application on behalf of her grandson, a sailor, who was minus a good dental equipment. When asked if she realized that he would have to get real good teeth if his application passed the committee, replied that she would teach him to take care of them; she had had a beautiful set for eighteen years and had never once forgotten to take it out when she had her meals.

—*Note and Comment, Oral Hygiene.*

MOUTH HYGIENE*

BY BURTON LEE THORPE, D.D.S., M.D., ST. LOUIS, MO.

AS EARLY AS 1683, Anton von Leeuwenhœk, a Dutch pioneer microscopist, discovered in calculi scraped from between the teeth, a form of micro-organism, upon which he laid special stress. This observation he embodied in the form of a contribution which was presented to the Royal Society of London, on September 14, 1683. This paper is of peculiar importance, not only because of the careful objective nature of the description of the bodies seen by him, but also for the illustrations which accompany it. From perusal of the text and an inspection of the plates, there remains little room for doubt that the bodies described by Leeuwenhœk were not animalcules as he believed, but bacteria. This observation led him to say, "More animals live in our mouths than there are people in Holland;" yet it has taken the dental profession over two hundred years to realize this fact, and really awaken to the crying need that the mouth, the filthiest cavity, excepting none, in the human body, if not kept clean and healthy is the contributing cause to the majority of systemic diseases that flesh is heir to.

To von Leeuwenhœk these micro-organisms were objects of curiosity; to us of the present age they are the objectives toward which our energies are more and more directed in efforts so to control their activities as to prevent the many evils due to their presence. Indeed, their control has called into being a new science, Mouth Hygiene, the subject of this paper; and the application of this new science has called into being a new specialty, having for its special object the prevention of those lesions which dental science has heretofore been mainly concerned in relieving.

A year or more ago herds of cattle and hogs in various sections of our country were wiped out by the ravages of foot-and-mouth disease, with incalculable loss to their owners. The U. S. government expended immense appropriations to eradicate this disease, but who of you has heard of the U. S. government taking any action in a preventive way to bring about impressing the lesson of human mouth hygiene on the people of our nation, or of any appropriations for the education, prevention or cure of the children, both young and old, who by rights should be the wards of the government? However, dental societies, municipalities, boards of education and many philanthropic individuals have realized the need and benefits of the dental clinic until now nearly every city and town of importance maintains clinics for the care and treatment of the children needing dental attention.

It has, thank God, been the benigning privilege of a few thoughtful men of the past to do deeds, to speak and write words that have driven home this truth that a clean mouth and healthy denture is nature's greatest adjunct in health conservation.

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*Lecture delivered at the Golden Jubilee Meeting, Tennessee State Dental Society, Memphis, June, 1917.

Two men who have done wonderful work in pioneer teaching and practice in this propaganda of mouth hygiene, i.e., Dr. Levi Spear Parmly, in the early day, and later in 1900; Dr. Richard Grady, now dental surgeon U. S. Navy, located at Annapolis, Md., presented the need of dental clinics in the public schools to the National Dental Association, and by his efforts the oral hygiene committee of the National Dental Association was organized, and from it has grown this great wave of prophylaxis that now overspreads the world.

The public press has also done much to promulgate this gospel of mouth hygiene, and the lay people begin to realize that the dentist is as necessary to the general health of a community as is the physician.

Yet many articles by lay people who write on the strength of their reputation for their personal beauty or physique, knowing little of their subject, do more harm than good to the cause.

In a recent Sunday edition "magazine," I find this pernicious advice in Lillian Russell's *Beauty Notes: "For the health of the gums it is important that the rules of hygiene should be observed in eating. Very hot and very cold, as well as acid drinks, should be avoided, and the mouth should be washed after each meal. The excessive use of the tooth brush is injurious. A very hard tooth brush should not be used, as it irritates the gums and finally wears the enamel, causing the teeth to drop out.*" Such rot as this contuses and misinforms the lay reader and hurts the cause. The sooner the dental profession banish some of their hide-bound ideas as to ethics the better.

It is my belief that each local and state society should have a press bureau composed of one or more members who can and will furnish the press copy of truthfully correct educational articles enlightening the public on the benefits to be derived from this great humanitarian science—dental surgery.

Some years ago it occurred to me that the operator who was called upon to put a mouth in a hygienic condition should have a systematic set of rules of procedure, and the understanding that the fundamental law of mouth hygiene is the same as "remove the cause, is the first law of surgery."

First: To put a mouth in a hygienic condition consists of the removal of all deposits by surgical means, the removal of all stains by polishing with engine brushes, porte polishers and tape. Scaling and polishing the teeth should be the initial operation. Many think mouth hygiene consists only of this operation, and when it is completed often in a superficial and an indifferent way, many times left until all other work in the mouth is finished or turned over to an assistant; that their duty here ends.

Second: The removal of all septic irritants, such as overhanging fillings, ill-fitting crowns and treatment and cure of diseased mucous tissue.

Third: The extraction of roots, incurable abscessing teeth and in the majority of cases of the third molars, especially in crowded arches, for impacted third molars in many cases cause criminal development and tendencies, moral degeneracy and nervous irritation as do adenoids and mouth breathing.

Anti-tobacconists made much of the death of Gen. U. S. Grant being caused by cancer from the use of tobacco; however, the initial cause was a jagged third molar root that caused the cancer that ended his career.

Fourth: The ligation of loosened teeth under treatment, with 28-gauge wire. The removal of carious tooth tissue, medication and filling of cavities temporarily with gutta percha, and later the proper restoration of the same, remembering the observing operator always anticipates caries.

Fifth: The restoration of missing teeth with partial dentures, crowns or bridges.

Sixth: The thorough instruction of the patient at the chair in proper home prophylaxis, in the use of brush, dentifrices, tongue-scraper, tape and gum massage and the insistance on stated periodic visits for examinations and treatments.

BRUSH AND MASSAGE

It is a rare thing, in this modern day of strenuous living, to find a mouth of a patient past sixteen years not needing dental treatment and repair. We may safely say not one out of one hundred people properly cares for his mouth. The most frequent excuse is that it takes too much time.

If a person is threatened with baldness, hours are spent in massage, while in most cases little or no time will be given to brushing the mucous tissues of the mouth or to gum massage.

The so-called tooth brush is miscalled. It should be called a *mouth brush* and so used. I do not want my patients to brush their teeth only, but to brush all mucous tissue, the roof and floor of the mouth, the gums, cheeks and tongue the first thing on arising and on retiring, and after each meal if possible. If they do this thoroughly and properly, they cannot miss brushing their teeth.

The thorough brushing of the gums with a rolling wrist motion is a stimulant unequaled, making flabby gums cling firmly to the teeth. Brushing the *upper gums downward* and the *lower gums upward*, towards the cusps and incisal edges, breaks up gelatinous plaques, infectious films, food and other deposits. Grasp the brush firmly in the palm of the hand, insert it down the throat on the palate, and brush out with a raking motion; also hold the brush on the floor of the mouth and brush the inner surfaces of the lower teeth with a raking motion; the same hold and motion should also be applied to brushing cusps and sulci of upper and lower teeth.

The brush next should be held reversed with bristles out, that lip and cheek muscles may be brushed and then with patient standing in front of mirror, the tongue should be cleaned with brush and tongue-scraper.

Personally, I do not want my patients to use a brush that has only one point of merit, i.e., "a hole in the handle," but want them to use a hard, stiff-bristle brush with tufts set far enough apart that bristles sweep between the teeth and permit toilet preparations or food to be easily washed out, with handle so curved that it fits the hand, assisting in using the proper rolling wrist motion.

Patients complain of a hard, new brush irritating the gums. Explanation should be made to them to go slowly and lightly at first, that the effect on sore gums is the same as is the hoe or rake on the hands in the spring, when one works in his garden. The first few days the hands blister but soon after callous. This is the identical effect on gum tissue. After a few weeks' use the gums may be brushed as hard as are the teeth. This is a personal habit in my own mouth and it is impossible to make my gums bleed by brushing or massage.

TONGUE-SCRAPER

Many patients have a constipated, furred tongue, covered with septic deposits which breed germs, infecting the food and drink swallowed and the air breathed, objectionable and highly detrimental to mouth cleanliness.

This may be partially overcome by the use, morning and night, of the tongue-scraper, which is objectionable to many because it produces gagging. This may be offset if the patient holds the tongue in a napkin to avoid cutting it on the lower front teeth, then draw it out, take in several deep, quick breaths and the tongue then may be cleaned from dorsal surface outward toward the tip. The patient, however, should be referred to a specialist whose duty it is to rectify fetor of the breath, which is presumably due to disorder of the stomach or bowels.

DENTIFRICES

No dentifrice, powder, paste or liquid, can have a medicinal effect upon the mouth tissues for an appreciable period. Therefore, I discourage the daily use of the prevalent mouth-wash habit and recommend to patients who desire highly polished teeth the use of a tooth powder, *used dry on a dry brush.*

Friction is needed in brushing the gums to stimulate them. Friction is needed also to polish and cleanse the surfaces of a set of teeth.

Modern pre-digested foods should be tabooed and hard foods recommended, with thorough mastication. This mechanically cleanses the teeth, induces the copious flow of saliva and massages the gum tissue. My belief in this for years past has led me to recommend the frequent daily use of chewing gum as an aid to a clean mouth, especially in children. The friction of the cheeks, lips and tongue in chewing gum is a most wholesome habit that relieves nerve tension and makes for a clean mouth.

None dispute that nicotine is a systemic poison and that chewing tobacco is a filthy habit, which all must deplore; however, from clinical observation it is my belief that the chewers of tobacco, especially the users of natural leaf which does not contain molasses, licorice or prune juice as do the cheaper modern brands, have cleaner mouths than non-users, due not to any merit of the "filthy weed" but entirely to the friction exerted in the process of chewing.

TAPE

A cleanly dental bridge must be built either on a tight-fitting saddle, made so by paring the cast, that the saddle hugs closely to gum tissue or with self-cleansing dummies that do not touch the gum tissue, making possible the removal of food by the friction of tongue and cheeks or by the brush. Filth from food *debris* or calculiary deposits, accumulates most at the necks of teeth next to empty spaces where a tooth or teeth are missing, or next to bridge tooth abutments. In these conditions the use of tape is indicated and should be insisted on, if the patient is desirous of preserving his teeth. Rubbing bridge abutments or teeth next to vacant spaces with tape, which is far superior to floss on account of its width, after each meal in cases above mentioned, will do much to keep down decay.

Doctor Sarrazin has recently placed on the market an ingenious bodkin in which tape may be threaded and carried under bridges or in inaccessible spaces, thus overcoming the difficulty experienced in times past in reaching out-of-the-way spaces with tape or floss.

GUM MASSAGE

Many teeth affected with pyorrhea and lost could have been saved if the patient had been instructed by his dentist how to thoroughly use the thumb and forefinger to massage the gum tissues.

Few dentists seem to realize the benefits derived from this treatment and fewer patients have ever heard of this method.

To stimulate circulation and strengthen the gum tissue we brush the gum toward the necks of the teeth, but to massage the gum tissue one must rub the gums from the periphery to the center of the mouth, kneading the tissue and rubbing it away from the tooth, driving the venous blood from the surface and permitting the deeper arterial blood to flow to the surface. This is directly opposite to what the average patient does or the average dentist understands or teaches by gum massage.

The dentist should resort to the surgical removal to establish a healthy condition, which may be greatly augmented both by frictional and medicinal treatment at the chair and in home prophylaxis.

The best remedy the speaker has yet discovered to aid in conjunction with gum massage is the formula of Dr. Will H. Whitslar, known as "zinc sulpho-carbolate:"

℞	Zinc sulpho-carbolate, ...	60 grains.
	Alcohol, ...	1 ounce.
	Distilled Water, ...	2 ounces.
	Oil Wintergreen, ...	8 drops

This for curative action and hardening the gums is excellent..

"The recognized antidote for the toxin of work is the antitoxin of play;" and just as necessary as this, especially for the patient past middle age, is the antitoxin of rest in the middle of the day.

For the past fifteen years I have religiously taken a reclining horizontal noon *siesta* for at least thirty minutes after lunch each day. This gives the heart and other organs a chance for rest and that both to operator and to the patient suffering with systemic derangement from whatever cause, overwork, worry or disease, there is no medicinal treatment that equals nature's greatest tonic—rest.

A general criticism applying to all papers upon the subject of hygiene and kindred subjects is that they reach only to relief, not prevention. Removing deposits is not preventing their re-occurrence. What causes these deposits?

It is one thing to see a finished clinical case fresh from the hands of a thorough operator and quite another thing to see the wrecked condition of the same mouth a few years after the patient has undergone an attack of la grippe, pneumonia or diphtheria.

This is no argument against mouth hygiene, but simply a caution that there are things at the present time quite beyond our knowledge, such as the real cause and cure of pyorrhea, resorption of the alveolar process, erosion and gum recession. These diseases often occur in mouths kept clean by all the rules of hygiene, yet what has prophylactics to offer to control such cases?

The public are daily being educated that the mouth and teeth are the seat of focal infection, and the time has arrived which our profession has been hoping for, i.e., when dental surgery reaches its merited place as a branch of the healing art. That time is here.

The question is, are we, as a profession, big and broad enough to master the task before us? Do we appreciate that mouth hygiene is the fundamental principle of our service to humanity?

Aside from the relief of actual pain, *hygiene* is the prime excuse for our professional existence and no practice is humane which does not stand for and produce improved hygienic conditions of the mouth.

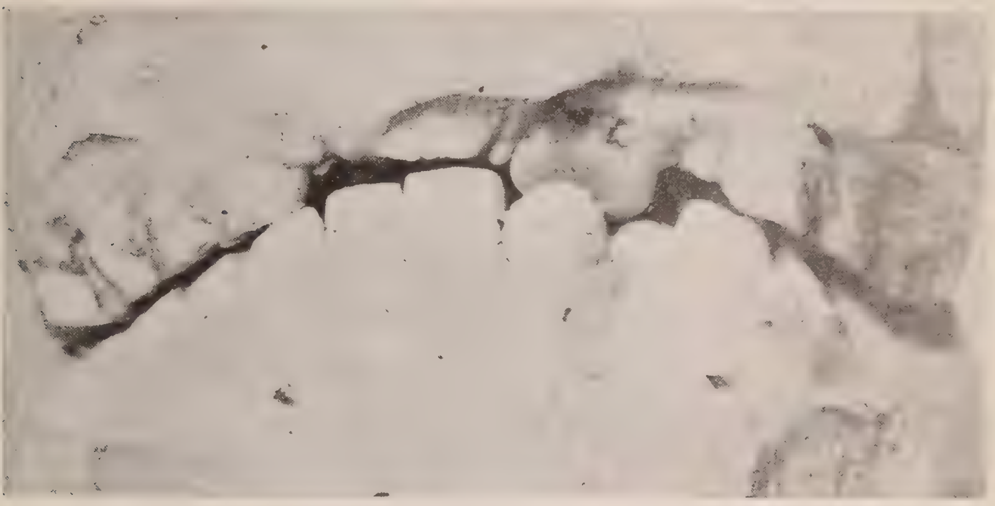
Let us come out of the lassitude and indifference of the past and awaken to our duty, realizing that if "eternal vigilance is the price of liberty," so persistent vigilance and effort in brushing and massage, both by the patient and dentist, is required to keep clean and healthy the human mouth.

Preach this gospel, plead, implore, beg, threaten your patients and if they will practice your advice, you will bring health, comfort, personal beauty and long life to your clientele and earn for yourselves the merited title, *preserver of health and preventer of disease.*

415 Metropolitan Building.

CORRESPONDENCE

SOME SELF-EXPLANATORY CORRESPONDENCE



Memphis, Tenn., March 20, 1917.

Editor Dental Summary:

Enclosed you will find some correspondence which I would be glad for you to give space to in your journal. It is the best in my collection so far, and the members of our local society enjoyed it so that they requested me to give others the benefit of it. The case in question, as you will be able to see from the models, was an inlocked upper central incisor, which was pushed out in one night by using the Jackson appliance locked upon the molars, which shows in the models sent. The child's mother was told the work would be completed in not longer than a week. The results obtained were entirely satisfactory until after bill was rendered.

Yours very sincerely,

W. E. Lundy.

Memphis, Tenn., February 10, 1917.

Dr. W. E. Lundy,
Bank of Commerce & Trust Bldg., Memphis, Tenn.

Dear Sir:

The attached bill under date of the 1st, covering dental work for my daughter, Rose, amount $25.00. This amount is evidently in error, as my daughter made only four trips to your office, three of which were for only a few minutes' duration.

I sincerely regret that I am unable to pay such prices for dental work, and I trust that you will make this bill consistent and reasonable with the actual work performed.

Yours truly,

W. F. S———.

Mr. W. F. S———. Memphis, Tenn., February 12, 1917.

Dear Sir:

Replying to yours of February 10th, relative to bill, I wish to say I am very much surprised to receive such a letter from a business man. Why you should presume to price orthodontia is beyond me. As a matter of fact, I only charged you the customary price for making the brace, which is $25.00, and on account of getting such quick results no charge was made for anything else, as is customary. You surely didn't take into account the trouble and expense in the construction of this type of brace.

I regret very much to have any of my patients think they have been overcharged, and am willing and glad to do what I can to show them the justice in the case, and will ask that you ask Mrs. Brooks, the dentist who referred the case to me, whether or not you have been charged too much.

Trusting this will be satisfactory, I remain,

Yours very sincerely,
W. E. Lundy.

W. E. Lundy, D.D.S., Memphis, Tenn., February 16, 1917.
Memphis, Tenn.

Dear Sir:

Referring to your letter of the 12th inst.:

Note the word "ORTHODONTIA" therein. It is a good word; in fact, I consider it an excellent word. I have looked at it from both the top and the bottom of the page, as have several of my friends, and have decided that it is a large group of letters assembled of the dentists, by the dentists and for the dentists, for the sole purpose of allowing a monetary charge which would be ridiculous for anything with an English name.

When Mrs. S—— first visited your office relative to this matter, you prophesied that the condition in question could be corrected by a protracted treatment, the expense of which would be twenty-five dollars, and that only by such treatment could a cure be effected.

The actual time required for such little work as you did on this case was practically negligible in comparison with your forecast. Nature and the child's tongue corrected the defect quite a while before you were ready to perform the miracle.

Two assumptions are open to me. One is that your diagnosis was based on ignorance rather than knowledge of the case. The other assumption is that you exaggerated the magnitude of your treatment to make it assume somewhat the same proportions as the compensation which you demanded.

In either case I consider that the enclosed remittance of twenty-five dollars was obtained from me by indirection or misrepresentation. Whether this was through ignorance or through willfulness, I have no means of knowing, but am willing to give you the benefit of which ever assumption you deem the more charitable.

Yours truly,
W. F. S———.

EDITORIAL

CONGRESS GIVES DENTISTRY THE SAME RECOGNITION AS MEDICINE

During the closing hours of Congress, the following bill relating to the Dental Corps of the army was passed and has been signed by the President:

65TH CONGRESS

[H. R. 4897.]

An Act to provide for the promotion of first lieutenants in the Regular Army and National Guard to the grade of captain, and respecting the Dental Corps of the Army and medical and dental students, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That during the existing emergency first lieutenants in the Medical Corps of the Regular Army and of the National Guard shall be eligible to promotion as captain upon such examination as may be prescribed by the Secretary of War.

Hereafter the Dental Corps of the Army shall consist of commissioned officers of the same grade and proportionally distributed among such grades as are now or may be hereafter provided by law for the Medical Corps, who shall have the rank, pay, promotion and allowances of officers of corresponding grades in the Medical Corps, including the right to retirement as in the case of other officers, and there shall be one dental officer for every thousand of the total strength of the Regular Army authorized from time to time by law;

Provided further, That dental examining and review boards shall consist of one officer of the Medical Corps and two officers of the Dental Corps;

Provided further, That immediately following the approval of this Act all dental surgeons then in active service shall be recommissioned in the Dental Corps in the grades herein authorized in the order of their senority and without loss of pay or allowances or of relative rank in the Army;

And provided further, That no dental surgeon shall be recommissioned who has not been confirmed by the Senate.

All regulations concerning the enlistment of medical students in the Enlisted Reserve Corps and their continuance in their college course while subject to call to active service, shall apply similarly to dental students.

Approved, October 6, 1917.

This enactment by Congress giving dental officers the same standing as medical officers in the army, is the greatest recognition the dental profession has ever received And now that this recognition has been given, it behooves the dental profession to assume full responsibility in connection with all that tends to promote and develop dentistry.

Heretofore the law has specified one dental officer for every thousand of *enlisted* men. This new legislation specifies one dental officer for every thousand of the *total strength* of the regular army, which means a greater number of army dental surgeons.

Suppose, however, we estimate the enlisted strength of the U. S. Army at present as being 300,000 men. That would mean at least 300 officers of the dental corps and this would create approximately 9 colonels, 16 lieutenant colonels, 71 majors and 204 captains and first lieutenants.

Under this new legislation, officers of the Dental Reserve Corps will automatically be accorded the same status as members of the Medical Reserve Corps, and this gives officers of the Dental Reserve Corps two additional grades, those of captain and major. However, it should be understood that of necessity those in the higher grades must be limited, but they will be in the same proportion as the higher grades in the medical corps. By this new legislation dental students are given the same privileges as medical students, viz.: *To enlist in the Enlisted Reserve Corps and continue in their college course while subject to call to active service.* This is a just provision. It means much to not only the colleges and the dental profession, but to the army and the general public as well.

Regarding the new legislation, Dr. Homer C. Brown, Columbus, Ohio, chairman of the Legislative Committee National Dental Association, who did the lion share in securing the enactment of the bill, gives the following explanatory data:

"The dental amendment commences with 'Hereafter,' and is a modification of the legislation introduced by Senator Lodge, and which was known to the dental profession as the "Lodge Dental Amendment." Unfortunately, Senator Lodge left Washington about two weeks before Congress adjourned and requested Senator Pomerene to take charge of our legislation. Inasmuch as considerable opposition had developed along certain lines, together with the fact that some of our friends strongly advised us to both modify and shorten our amendment, we did so in two particulars and placed this in the hands of Senator Pomerene a few days before Congress adjourned. Our understanding was that he was to vigorously push this in the event H. R. 4897 came before the Senate for consideration. First, the modification was by adding the underscored words which were thought by many to be of vital importance. The second was the striking out of the two following provisions:

> "*Provided*, That all laws relating to the examination of officers of the Medical Corps for promotion shall be applicable to officers of the Dental Corps; *And provided further*, That first lieutenants in the Medical Department shall be promoted to the grade of captain upon

> the completion of three years' service in that grade in the Medical Department and upon passing the examinations prescribed by the President for promotion."

These two provisions were eliminated owing to existing conditions which made them of no particular value. The last two provisions in the legislation as enacted were presented and agreed to when the amendment was before the Senate for consideration. I do not understand the first one of these sufficiently to make any comment at this time, except that it would seem to be out of place. The second one is very important and adds another link to our contention for "equal status."

"No disappointment should be occasioned because the Dental Reserve Corps is not specifically referred to; however, this new legislation automatically provides the same grades for our Reserve Corps members as are provided for the Medical Reserve Corps. That is, the grades of lieutenant, captain and major. Thus we secured two additional grades, as we had the grade of lieutenant in the Reserve Corps under the provisions of the National Defense Act, June 3, 1916. Naturally the higher grades will be limited in number, but should be proportionately distributed in harmony with those of the Medical Corps."

Among the members of Congress who gave support to the measure we desire to mention particularly Senator Atlee Pomerene, of Ohio, who worked assiduously for the bill; Senators Lodge, of Massachusetts, Fletcher of Florida, and Overman, of North Carolina, and Congressmen Dent, of Alabama, who diplomatically conducted the bill through the House in the closing hours of its session; Kahn, of California, Towner, of Iowa and Foster, of Illinois.

Through the passage of this Act the dental profession has much to be thankful for, as it is one of the greatest advanced steps ever made in dentistry, and all praise is due those men who fought the good fight and won the race.

THE COMING MEETING OF THE OHIO STATE DENTAL SOCIETY

The next meeting of the Ohio State Dental Society in Cleveland, beginning December 5th, promises to be one of the best meetings ever held. Men of national reputation will be there to enlighten the dentists, and the program committee asserts that every session will teem with high-class instruction in those phases of dentistry that at present are the most vital to the profession.

We urge every member of the society to attend. If you do not it will be your own loss. A cordial invitation is also extended to ethical dentists from other states, and it is hoped that many will be present.

A partial program of the meeting is published elsewhere in this issue of The Summary.

SUGGESTIONS

Conducted by F. R. Chapman, M.S., D.D.S., Comumbus, Ohio

(To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Bldg., Columbus, Ohio.)

Do You Save Burnt Coating and Investing Materials?

After cutting out the inlay or plate from the investing material, throw the material into a box. When two or three pounds' weight have been saved, put it into a dish and wash it under the tap. Wash it as one would pan gold. The recovery of gold from this will be surprising.

—*J. Levin, Commonwealth Dental Review.*

To Remove Mercury Stains From Gold

Whether in or out of the mouth, the application of a little iodin (fort), followed by polishing with pumice powder and hydrogen peroxid, will be found successful.—*Reginald S. Boys, Commonwealth Dental Review.*

A practical little instrument for removing the rubber from between the teeth of a vulcanite plate: An old hand-piece, or any handle that will hold your old burs will do. Slip in the old bur, grind down to any kind of a point desired. They are strong and will do the work. Try it.

—*J. N. Sadler, Delphos, Ohio.*

For Spongy Gums and Inflamed Membrane

℞	Potass. chloratis	ʒ ij
	Sodium diboratis	ʒ j
	Potass. nitratis	ʒ ss
	Tinct. arnica	ʒ ij
	Aq. cinamomi—q. s.-ad.	℥ viij M

Sig.—Mouth wash as directed T. I. D.

If used after each meal, full strength, this will work out beautifully.

—*J. C. Schmitt, Louisville, Ky.*

A Simple Dentimetre

Take an old broken instrument with a fairly broad point (such as an excavator which has been broken at the shoulder) and flatten same. File up to form a conical shape. Drill two small holes parallel with each other in this shape. Thread binding wire about four or five inches long through one hole, then on reverse side thread the other end of the wire. After estimating the size of the required measurement, twist the ends of the wire round the handle of your instrument. Then you have a dentimetre ready for use.

—*Septimus Isaacs, Commonwealth Dental Review.*

To Remove the Stain of Iodin

Iodin stain can easily be removed from dental napkins and other fabrics by washing the spots in ammonia water.—*C. A. K., Oral Health.*

Use of Suprarenin

Regarding the use of suprarenin as an addition to a local anesthetic solution, we should be extremely guarded relative to the quantity of this highly reactive compound. Ordinarily, we add one drop of the suprarenin solution (1-1000) to one cubic centimeter of the anesthetic solution. But as we increase the quantity of the solution to be employed for a single injection, we must proportionally reduce the amount of suprarenin. Usually we employ it according to the following graded schedule: Suprarenin, one drop added to 1 c.c. anesthetic solution; two drops added to 3 c.c. of solution; three drops added to 5 c.c. of solution; four drops added to 8 c.c. of solution; five drops added to 10 c.c. of solution.

If we employ the suprarenin in the above proportions we avoid to a large extent the toxic effects which are prone to occur if we use it in too large quantities.—*Hermann Prinz, Dental Cosmos.*

Extraction of Abscessed Teeth

There is no more reason why an abscessed tooth should be retained in the jaw simply because the face is swollen than there would be to allow a splinter of wood to remain in the hand, a piece of glass in the foot, or a piece of steel in the eye.—*C. A. Kennedy, Oral Health.*

Antidote for Cocain

Ether is the antidote for cocain or novocain poisoning. The method of administration is to put a few drops on the ether mask without excluding the air. The patient soon revives.—*Editorial, Dominion Dental Journal.*

To Find an Obscure Canal

In some cases tr. iodin swabbed in the chamber and then wiped out with alcohol will disclose an obscure canal, because some of the iodin will remain in the mouth of the canal.

—*B. Elliot, Northwestern Journal of Dentistry.*

Beware of leaving blood in the chambers of an anterior tooth. Plain water is best to remove blood that has dried on the walls.

—*B. Elliot, Northwestern Journal of Dentistry.*

NEW PUBLICATIONS

Dental Metallurgy. For the Use of Dental Students and Practitioners, by Ewing Paul Brady, D.D.S., Professor of Chemistry, Physics, Metallurgy, Materia Medica, Therapeutics and Special Pathology, Washington University Dental School, St. Louis, Mo.

This is the one book on a technical subject that I have had opportunity to examine and at least partially read that seems to me to fulfill every requirement to be looked for in such a work, for the one reason, if no other, that the reader can find what he wants and all that he wants when he wants it, quickly, without multitudinous cross references and unnecessary labor and delay. I do not remember to have examined a book of any kind that so completely satisfies my ideal as does the one under consideration. Such a work is necessarily one of reference, particularly for the practitioner; it is not at all likely that any busy dentist would care to sit down and read it through; nor was that the idea of the author, who very evidently understood the reader's needs. Various metals are treated under proper headings, covering about all that is known concerning each, so that once the proper page is found the information sought is readily accessible; it is right there, and nowhere else. Much other valuable information of a general nature is compressed into its 322 pages, such as alloys, solders, heating appliances, etc. Taken as a whole, the volume is one that every dentist needs and will find of great value. It is published in the usual tasty and acceptable form by Lea & Febiger, Philadelphia, Pa. —G. E. H.

A Manual of Dental Prosthetics. By George Henry Wilson, D.D.S., Professor of Prosthesis and Metallurgy in the Dental Department, Western Reserve University, Cleveland, Ohio; Special Professor of Prosthesis in the Dental Department, University of California, Los Angeles, Cal. Third and Revised Edition. Philadelphia and New York; Lea & Febiger, Pub., 1917. Price, net, $4.50.

The great demand for this popular work has already made a third edition necessary. The author states that the motive of the book is *much in a few words.* The purpose is to give the technic clearly once, and to elaborate the underlying principle as much as may seem necessary. The book is designed for both the busy practitioner and the student; therefore in addition to the standard instruction in methods and materials, the recent methods and materials are presented and discussed, but without prolixity. The book has been enlarged and thoroughly revised.

The chapters on Impressions and Retention have been elaborated and brought fully up to date. Dr. Rupert E. Hall's theories on antagonization are presented in a clear and concise manner in this edition. Anatomical antagonization as treated in former editions has been further studied from a practical standpoint. Of the other new additions to the work may be mentioned: Impression Material and Methods, Teeth, Partial Plate Dentures, Protesyn, etc.

The book is illustrated with 439 engravings. It is a book that every dentist can read and study with profit.

Applied Anatomy and Oral Surgery for Dental Students. By Robert H. Ivy, M.D., D.D.S., Assistant Surgeon Columbia Hospital, Milwaukee; former Assistant Surgeon, University of Pennsylvania Hospital; former Instructor in Oral Surgery, University of Pennsylvania; second edition, thoroughly revised. 12mo of 290 pages, illustrated. Philadelphia and London; W. B. Saunders Company, 1917. Price, cloth, $1.75 net.

The author says that this book is an attempt to collect in one place and in a few words the special anatomy and surgery required by the dental student. It is not intended to replace larger works on anatomy and general and oral surgery, but rather to indicate to the student the subjects that require his particular attention. The book contains 290 pages of text, illustrated with good engravings and is neatly printed and bound.

Dental Materia Medica and Therapeutics, with Special Reference to Rational Application of Remedial Measures to Dental Diseases. A text-book for Students and Practitioners. By Hermann Prinz, A.M., D.D.S., M.D., Professor of Materia Medica and Therapeutics, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania; formerly Professor of Materia Medica, Therapeutics and Pathology, and Director of the Research Laboratory, Washington University Dental School, St. Louis. Fifth edition, enlarged and revised according to the U. S. Pharmaopeia, ninth decennial revision. St. Louis; C. V. Mosby Company, Pub., 1917.

The present edition of this excellent work has been entirely rewritten and much new material and many new illustrations have been added. Although the fourth edition was published only a year ago, the great demand for the book has made a fifth edition necessary. The book has been adopted by the U. S. Army and every dental unit going to France will carry with them a copy of the publication.

The latest edition of the U. S. Pharmacopeia contains numerous important changes relative to average doses of drugs, and also the addition of valuable compounds of special interest to the dental practitioner. These changes have been duly considered in this present revision of the text. Newly added drugs of special interest to the dentist are cotarin hydrochlorid, nitrogen nonoxid, oxygen, paraformaldehyd, beta-eucain, hydrochlorid and sodium perborate.

To facilitate the ready location of drugs according to their therapeutic uses, a properly-classified index of drugs has been added. The text of the book as it now appears harmonizes with the latest achievements in dental materia medica and therapeutics.

Hand Book of Anatomy. By James K. Young, M.D., F.A.C.S., Professor of Orthopedic Surgery, Philadelphia Polyclinic; Associate Professor of Orthopedic Surgery, University of Pennsylvania; Orthopedic Surgeon to the Philadelphia General Hospital, etc. Fifth edition, revised and enlarged. Philadelphia; F. A. Davis Company, Pub., 1917. Price, $2.00 net.

This book is a complete compend of anatomy including the anatomy of the viscera, a chapter on dental anatomy, numerous tables and incorporating the newer nomenclature generally known as the Basle nomenclature. All revision necessary has been made to the text to make it conform to the recent advances in anatomical studies since the publication of the fourth edition.

The book contains a special chapter devoted to dental anatomy, comprising the anatomy of the face, teeth and jaws, properly illustrated, prepared by Joseph L. Appleton, Jr., B.S., D.D.S., of the Thomas W. Evans Museum and Institute of Dentistry, University of Pennsylvania. Throughout the book there have been some eliminations, many alterations and a large number of additions. These changes together with the replacement of the older cuts in the chapter on Osteology by far superior illustrations, the author says has necessitated a recasting of the entire book.

Modern Dental Materia Medica, Pharmacology and Therapeutics, Including the Practical Application of Drugs and Remedies in the Treatment of Disease. By J. P. Buckley, Ph.G., D.D.S., Professor and Head of the Department of Materia Medica, Pharmacology and Therapeutics, and formerly Director of Chemical Laboratories, Chicago College of Dental Surgery. Fourth edition, revised. Philadelphia; P. Blakiston's Son & Co., Pub., 1917. Price, $3.50.

The author states that this book has been rewritten and thoroughly revised; Part I in accordance with the U. S. Pharmacopeia, and Part II in accordance with the knowledge of today relating to the treatment of diseases of the teeth and associated structures. An effort is being made in the profession today to treat teeth under as nearly aseptic conditions as possible, and it was with this end in view, the author says, that an article on Dental Sterilization has been written; also an article on Biologic Products. The advanced therapy of many infectious diseases includes the intelligent use of products from biologic laboratories, many of the systemic diseases of this character are now known to have a direct relation to diseased mouth and nose conditions; therefore it is important that the student and the practitioner of dentistry understand the principles upon which this therapy is based.

Part II, which deals with dental therapeutics, is more profusely illustrated than in former editions. There is no problem in dentistry at the present time of greater importance than the treatment of pulpless teeth and their sequelæ. On this particular subject many illustrations have been added which show results of treatment after the methods described in the text. The colored engravings, especially those relating to the diseases of the soft tissues of the mouth, will aid greatly in the recognition of these diseases as they present in practice.

SOCIETY·ANNOUNCEMENTS

Indiana State Board of Dental Examiners

Next meeting of the Indiana State Board of Dental Examiners will be held at the State House, Indianapolis, November 12-17, inclusive. Applications and other information may be obtained by addressing H. C. McKittrick, Secretary, Indianapolis.

Michigan State Board

The next session of the Michigan State Board of Dental Examiners for the examination of candidates wishing to practice dentistry in the state of Michigan will be held in the city of Ann Arbor (Dental College Building), the week of November 5th to 10th, inclusive. Applications should be made early as all preliminaries must be complete and in the hands of the secretary not less than ten days prior to the examination. Photographs and itemized preliminary educational qualifications required of all candidates.

For all further information address, E. O. Gillespie, *Secy.-Treas.*,
Stephenson, Mich.

Texas State Board

The Texas State Board of Dental Examiners will hold its next examination in Dallas, Texas, beginning Monday, December 17, 1917. No diplomas exchanged, no reciprocity. All applications accompanied by the fee of $25.00 should be in the hands of the secretary no later than December 12th. For further particulars and application blanks, address,

Harrison B. Cave, *Secy.*,
810-14 Wilson Bldg., Dallas, Texas.

Pennsylvania State Board

The next examination of the Pennsylvania Board of Dental Examiners will be held in Musical Fund Hall, 808 Locust street, Philadelphia, and the University of Pittsburgh, on Tuesday, Wednesday, Thursday and Friday, December 4, 5, 6 and 7, 1917. The examination in operative dentistry will be held on Tuesday, December 4th, at 8:30 o'clock, in the Philadelphia Dental College, 18th and Buttonwood streets, Philadelphia, and the University of Pittsburgh Dental Building, Pittsburgh; prosthetic dentistry, Tuesday, 1:30. Application papers can be secured from the department of Public Instruction, Harrisburg. For further information address,

Alexander H. Reynolds, *Secy.*,
4630 Chester Ave., Philadelphia, Pa.

Colorado State Board

The Board of Dental Examiners of the state of Colorado will meet in Denver, Colo., Tuesday, December 4th, 1917, at 8:00 A.M., for examination of applicants for license to practice dentistry in the state of Colorado.

In addition to the written examinations, applicants must supply their own patients, instruments and materials, and come prepared to do practical work under the supervision of the Board. All applications must be in the hands of the secretary not later than December 1. For application blanks and information, address R. C. QUICK, *Secy.*,
310 Metropolitan Bldg., Denver, Colo.

Vermont Board of Dental Examiners

A special meeting of the Vermont Board of Dental Examiners for the examination of candidates to practice in Vermont will be held at the State House, Montpelier, Monday, November 5th.

To be eligible for examinations a candidate must be (1) twenty-one years of age, (2) a graduate of a high school of the first class, and (3) of a reputable dental college.

For further information apply to Harry F. Hamilton, Secy., Newport, Vermont.

INDIANA DENTISTS READY

Thirteenth District Society Goes on Record for Patriotic Service

South Bend, Ind., Sept. 29.—Dentists of this city and other centers of the Thirteenth District went on record at a meeting in the Oliver Hotel, Friday night, as dyed-in-the-wool patriots. They will treat all drafted men free of charge, supply their own dental material and pay the expense of printing and messenger service.

Dr. John A. Stoeckley, president of the district association, named F. L. Axtell for District No. 1; A. R. Messick, district No. 2, and L. W. Walton, of Mishawaka, district No. 3. Examining dentists for boards outside of this city, appointed by Dr. Stoeckley, follows: Kosciusko county, J. R. White; Laporte, J. C. Sawyer, Michigan City, and F. E. Freeman, Laporte; Marshall county, B. F. Hitchcock, Plymouth; Fulton county, Perry Heath, Rochester; Stark county, H. S. S. Stoddard, Knox; Elkhart, D. W. Singer, Goshen, and George Harter, Elkhart.

All local dentists will be given an opportunity to state whether they will volunteer for the service.

The next regular meeting of the district association will be held at Goshen, November 10th. There are one hundred members in the society.

Following are the resolutions adopted:

Whereas, This society has been informed indirectly by the Surgeon General of the United States of America that there is a scarcity of men qualified in the profession of dentistry in connection with the Selective Draft Army now being assembled, which said scarcity has resulted in a request by the proper department of the army for the free treatment by the dental profession of those selected under the draft act who require treatment of the teeth, which said demand and request has been cheerfully acceded to by the profession generally and particularly by the members of this society; and

Whereas, It has come to the attention of this society that the precautions exercised with reference to students in the medical profession have not been extended to dental students, many of whom are being called to the colors without being permitted to finish their course of training to qualify themselves as practicing dentists; and

Whereas, It is the belief of the members of this society that the demands upon the profession, by reason of the war, will be such that the number of practicing dentists should be increased rather than diminished. Now, therefore, be it

Resolved, By the Thirteenth District Dental Society of Indiana, in regularly called meeting assembled in the city of South Bend, this 28th day of September, 1917, that it is the sense of this meeting and the earnest belief of the members of this association that every safe-guard should be exercised to permit those who have practically completed their course of training qualifying them for active practice of the profession of dentists in the United States to finish such necessary training, so that the number of qualified dentists be not diminished; and

Whereas, Dr. Harry R. Jones, a member of this society, a practicing dentist with offices at 102 Dean Building, South Bend, Indiana, and a graduate of the Indiana Dental College, and duly licensed to practice his profession in the State of Indiana, has heretofore offered his services to the government by applying for appointment in the Dental Reserve Corps, which said appointment was denied by reason of the report of the examining board that the said Jones was found physically disqualified for such appointment; and

Whereas, The said Harry R. Jones has, subsequent to said examination, been called under the Selective Draft Act, and upon examination under said Selective Draft Act, has been found physically fit for military service, and in due course will be called for military service under said Selective Draft Act; and

Whereas, The members of this association have knowledge of the training, skill and ability as a dentist of the said Harry R. Jones and believe that in view of the scarcity of dentists in the military service of the government, the said Dr. Jones can be of greater and more efficient service in the practice of his profession in connection with said military service than in any other branch of service to which he might be assigned; now

Therefore Be It Resolved, That this society does hereby recommend that such action be taken by the proper authorities of the War Department either by re-examination of the said Dr. Jones under his original application for appointment in the Dental Reserve Corps or by transfer of the said Dr. Jones under the Selective Draft Act to said Dental Reserve Corps as will give to the government the benefit of the extensive study, training and experience by reason of which the said Dr. Harry R. Jones is qualified to practice his profession of dentistry.

Dr. John A. Stoeckley, of South Bend, St. Joseph County, Indiana, as president of the Thirteenth District Dental Society of Indiana, hereby certifies that the above is a true copy of the resolutions of said dental society duly authorized at a regular called meeting of said society, held in the city of South Bend, on the 28th day of September, 1917.

John A. Stoeckley, *President.*

N. B.—Since the above article was put in type, the dental bill referred to was passed, just before Congress adjourned, and is now a law, thanks to the efforts of the dentists of the Thirteenth District, Indiana, and others like them.

A Warning

The following letter sent to secretaries of state dental societies is self-explanatory and important:

"It has been brought to the notice of the government at Washington that men within the conscription age have made application to dentists to have teeth extracted to the extent of incapacitating them for military service. Orders have been issued to the state and local societies to inform the members that such cases are to be immediately reported to Dr. T. A. Broadbent, 25 E. Washington Street, secretary of Chicago Dental Society, giving name and address if possible of such persons.

"It is also demanded that men within the conscription age who have teeth extracted be prepared to produce the extracted teeth on request of the exemption board.

"Dentists who are guilty of extracting for this purpose will be prosecuted to the fullest extent by the Federal Government.

"Notify your members immediately upon receipt of this letter."

Fraternally yours,
T. A. Broadbent, *Secretary,*
Chicago Dental Society.

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXVII December, 1917 No. 12

We Publish the Proceedings of the Following Societies:

The Ohio State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
Iowa State Dental Society
Texas State Dental Society
Tennessee State Dental Society
Section on Stomatology—American Medical Association
Interstate Association of Anesthetists
and Several Local Dental Societies

Editorial Office: 195 16th Avenue, Columbus, Ohio
L. P. Bethel, M.D., D.D.S., Editor-in-Chief

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REGULAR CONTRIBUTIONS

REMOVABLE RESTORATIONS*

BY DAYTON DUNBAR CAMPBELL, D.D.S., KANSAS CITY, MO.

IT IS IMPOSSIBLE to justify a dental restoration which does not have as its ultimate purpose the preservation or perfection of the normal occlusion of the teeth. Whatever may be said about causes of failure in dentistry, your essayist is firm in the belief that all of these occurring in cases of partial restoration point to faulty occlusion resulting in traumatic injury to the tissues enveloping the teeth, as the paramount cause. Faulty occlusion is due to the lack of an intimate working knowledge of the anatomical relationship of the tooth cusps in masticatory effort. This lack may be largely remedied through the use of "study casts" and the employment of devices, natural or artificial, permitting proper occlusion in the various stages of the progress of the work.

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*An illustrated lecture given at the Golden Jubilee meeting of the Tennessee State Dental Association, Memphis, June, 1917.

This paper, accordingly, seeks to emphasize the attainment of a perfect occlusion through the employment of partial restorations, and to consider in detail certain partial restorations which possess superior commendatory features.

The range of choice in restorations for an individual case makes the final selection of any one of these an act involving vital moral and ethical aspects. The larger the field of selection the more difficult the choice. We may narrow the field by keeping in mind the purpose underlying our endeavor to secure perfect occlusion, which is to preserve or improve the health and life of the patient. While emphasis is placed upon the *health* of the patient, we may incidentally remark that we have known some very healthful individuals who were poor specimens for the artist's purposes; we, therefore, note that a successful restoration may contribute also to the esthetic appearance of the patient, besides enhancing his capacity to enjoy life and promoting his general efficiency.

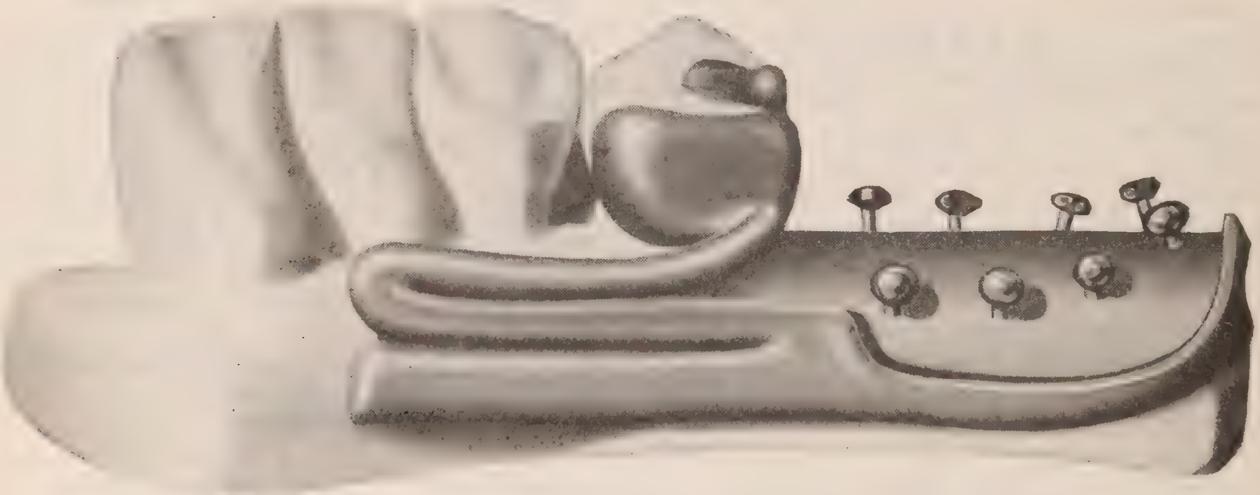

Fig. 1. Heroic cast—with large model of grasshopper-leg adjunct.

It is scarcely necessary for the writer to suggest that under normal conditions the best service that can be rendered a patient is to preserve for him his natural teeth. It is no violation of this rule, however, to insist that a loss of all but two or three teeth in either arch justifies the elimination of these as well. In cases of pyorrhea it is very often the wisest method to advise that all of the teeth be extracted without delay, since a delay of two or three years may permit the resorption of the alveolar process to such a degree that nothing remains to withstand lateral stress. This is apparently the most difficult decision that the dentist is called upon to make and to maintain—that is, to say whether the remaining teeth with their small area of masticatory surface shall remain as aids in the retention of partial restorations, or be removed in order that complete restorations may be made. In the vast majority of cases the dentist is doubtful of his ability to provide something better, and the patient noting this, in the very manner of the dentist, is more firmly convinced regarding the negative virtues of anything that that dentist can make. The patient wins out in evident reliance upon the strength of the old saying that "a bird in the hand is worth two in the bush;" finally deciding that one tooth in the jaw is worth two on the plate. In the light of recent achievements by Dr. Rupert E. Hall, the above decision by both patient and dentist proves sadly erroneous.

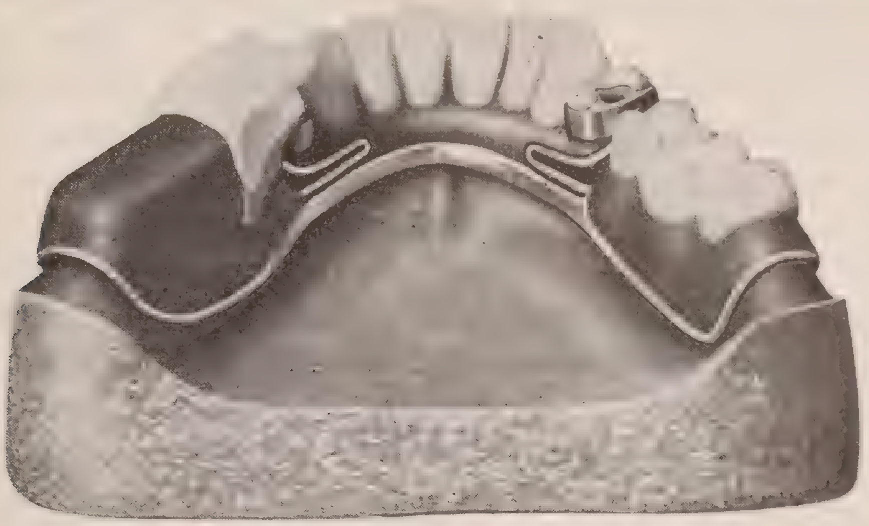

Fig. 2. Cast clasp with grasshopper-leg adjunct and lingual bar gold base in position. Plaster is placed between wax bite and attachment and patient is requested to close. Right side completed.

With reference to cases warranting restorations which make use of the patient's own teeth in securing anchorage, the field of selection is immediately narrowed with practically unanimous consent by the positive and final rejection of the *large fixed* bridge. After this rejection, the field of possibilities ranges from the inexpensive, easily-constructed partial plate to the elaborated attachments and complicated retaining devices of removable bridge work—the inexpensive including clasps, Gilmore attachments, Roach attachments, the Cummer indirect retainer, while with the expensive may be enumerated the telescope crown, the split-pin, the split-bar, the Chayes attachments. In the latter class the dentist may, within certain acknowledged limits, give full play to the promptings of his genius. The writer does not question the superiority of the more expensive restorations to the less expensive, but he recognizes that the personal equation on the part of the patient determines the measure of superiority in comfort, in speech, in palatability of foods, and in ability to maintain a pride befitting one's station

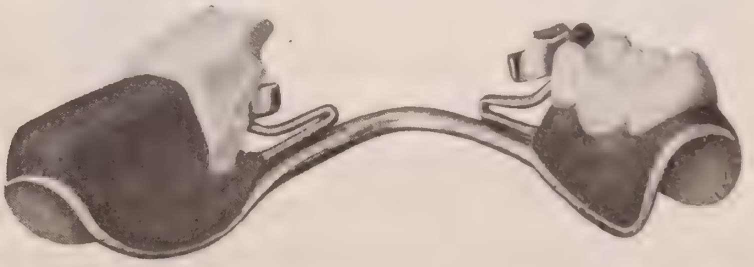

Fig. 3. Case ready to invest, wax and plaster are removed and the extremity of the leg soldered to the lingual bar. Right side completed.

in life. There is no argument to support a dentist's recommendation of jeans and blue denim to a patient whose manner of living calls for broadcloth.

The primary source of satisfaction which a patient finds in wearing a minor restoration of the inexpensive kind may be more fully supplied through the more expensive devices. The truth is, that many minor restorations supplying one, two or more teeth are being worn with apparently full satisfaction to both patient and dentist—although the satisfaction is derived from a service which neither has primarily in mind. A concrete example of this is a small vulcanite denture replacing six-year molars in the lower jaw, which the patient wears with comfort and satisfaction—and the patient in reality masticates much better with than without it, but certainly not *upon* it. On second thought one would realize that the area sustaining the pressure of any force exerted upon the denture equal to that exerted upon the adjacent teeth would be accompanied by pain and discomfort. The service rendered is not in the supposedly increased masticatory surface provided but in the ease with which, now, the bolus of food in its masticatory excursions is kept on the masticatory surfaces of the teeth. The food, in its excursions from lingual to buccal positions, does not have to be rescued each time from the otherwise edentulous space. Your writer is constrained to believe that this feature of partial plates commends them unconsciously to the use of the wearer, more than any other feature save perhaps the esthetic and cosmetic features. I have no record in my experience of a case in which either a partial upper or lower or both are being worn, but that the real incisive or triturating process is being carried forward on the remaining natural teeth. If this condition does not prevail when first inserted it results within a few weeks, as a consequence of recession, resorption or other causes.

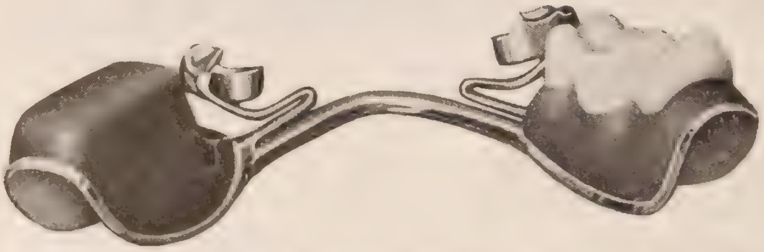

Fig. 4. Grasshopper-leg adjunct soldered and ready for bite. Right side completed Practical upper.

The superiority of the superior grade of workmanship is best presented through the use of study casts, the practical aid of which for many purposes cannot be over-estimated. During the past few years it has been the writer's pleasure to meet a great many dentists in different parts of the country, and of the entire number there have been few who ever gave any indication of having previously visualized the completed case before the work was begun. How many of us have a mental picture of the occlusion which our proposed restoration will furnish? There is not a shadow of a doubt in my mind that time spent on the study of occlusion is a hundred-fold more profitable than the same amount of time devoted to the invention of intricate attachments or to the elaboration of patent devices. No dentist should feel any embarrassment in telling his patient that he is unable to say without first studying the case just what he will recommend. Nothing is so well calculated to inspire your patient with confidence in your ability to meet the exigencies of that particular case than is a submission of a number of devices or methods and their comparative advantages and disadvantages—including the economic or financial considerations also. The contemplated piece may be constructed from soft copper wire and wax, and painted with gold bronze. Casts are as serviceable to the patient in determining a selection as tailor-made suits are superior to samples of cloth from a mail-order house. The construction is simple and whether you call it salesmanship or "the graphic portrayal of the possibilities of the case," the results are the same. The ease and simplicity with which an impression in modeling compound is taken for a study cast offers no excuse for careless impressions, although it is too often the explanation for them.

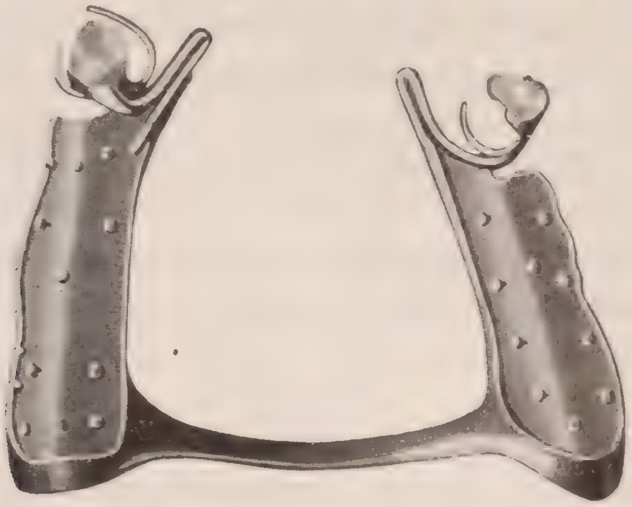

Fig. 5. Gold base—with combination cast and wire clasps including the grasshopper-leg adjunct.

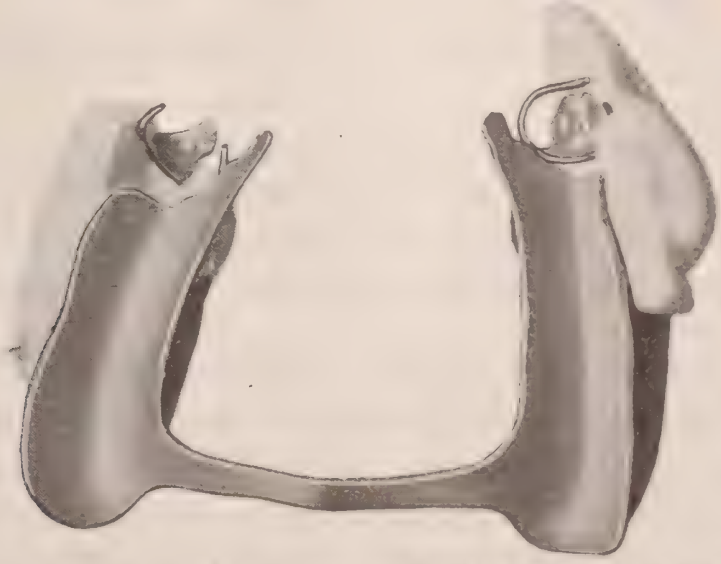

Fig. 6. Practical upper gold base, showing method of holding clasps in position until invested.

The most successful construction of restorations where the occlusion is to be determined outside of the mouth is achieved through the use of the Hall articulator. Occlusion may be defined as that intimate relation of the tooth cusps that provides for milling, grinding, triturating contacts which thoroughly disintegrate the morsel of food while the force employed is directed parallel with the long axis of the tooth. This involves the relationship of the tooth to its socket and to the tooth with which it is in antagonization. In this connection the writer believes that he is the first to suggest the use of the Hall articulator in the construction of bridge work—a suggestion made a year ago while a guest of the Nebraska state meeting. The principle upon which the Hall articulator is built is diametrically opposed to that of all others on the market, in that it takes no cognizance of the movement of the condyle in the glenoid fossa but instead depends upon the tactile sense of the tooth cusp. However, the angle of the tooth cusp is in full dentures arbitrarily fixed.

In partial restorations full casts of the upper and lower jaws preserving intact the remaining teeth, with the antagonizing cusps in synchronous or harmonious cusp relationship, are mounted on the Hall articulator in order to provide the normal individual movement which is to be incorporated in the partial denture under construction. The edentulous portion of the case is supplied with the artificial substitutes and each one ground to correspond with the angle already established by the natural teeth. The grinding is continued on the basis of the direction pointed out by lateral jaw movements as determined by the tooth cusps. Since the bite is no uncertain factor in partial restorations, there being landmarks sufficient, a try-in is, so far as occlusion is concerned, a waste of time, and furthermore is not in the majority of cases accompanied by satisfactory results. To state briefly the substance of this effort, we may say: Aim to secure for each tooth, natural or artificial, an individual occlusion.

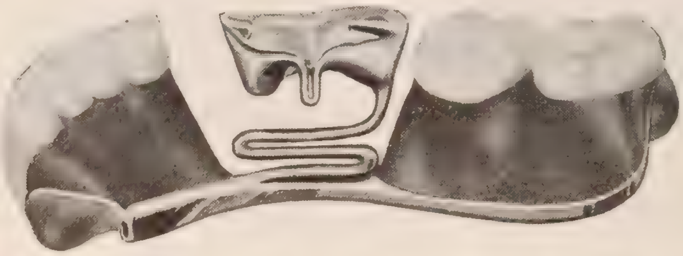

Fig. 7. Practical gold case showing attachment to first and second bicuspids; also double grasshopper-leg adjunct.

Where the restoration is to be of teeth attached with vulcanite, the bite is not opened on the articulator, since the teeth, though every precaution has been taken in packing and closing the flask, will come from the vulcanizer protruding from the vulcanite sufficiently to allow material for the final grinding of the occlusion in the mouth. In making corrections with the aid of artificial restorations the dentist ordinarily neglects to avail himself of the aid which liberties with the natural teeth afford. Especially is this neglect manifest with reference to teeth which during a long period have been of no service in mastication; for example, long cusps that have not been used for years should be cut off to approximate those which have been in actual service continually. It is wise to apprise the patient of the fact that decay cannot occur upon these ground surfaces if they are continually used in mastication. This method of perfecting the occlusion is, of course, not new, but it is so indispensable to success that it needs to be emphasized. As much as possible of No. 120 carborundum powder, or No. 100 grit, is mixed with tooth paste and placed upon the surfaces of the teeth when the patient is requested to chew. The flow of saliva is very quickly so profuse that the grinding material is washed away. Ofttimes from six to eight applications and from fifteen to twenty minutes are required. While this would be a very disagreeable process for individuals with all their natural teeth, the grinding material confined to the artificial cusps provides no unpleasant sensations such as the patient anticipates.

What proportion of dentists insist on supplying porcelain teeth in the case of bicuspid and molar restorations, when they know full well that the porcelain tooth cusp provides a masticatory surface incomparably superior to the gold crown from which the food slides like soap from a marble stand? In this one respect, a comparatively poorly-constructed and illy-adapted partial plate is superior to the finest piece of stationary bridge work with gold cusps and inaccessible areas in which particles of decaying food collect.

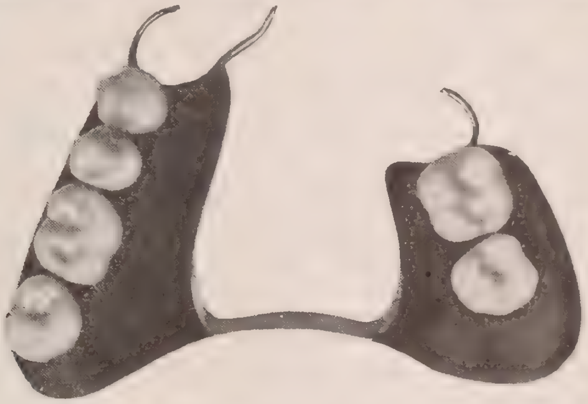

Fig. 8. Practical case showing the Cummer indirect retainer. Both clasps and retainer constructed of Ney-Oro Elastic Gold, 16 gauge.

No complete set of instructions for the taking of impressions may be given, because the variations of a method are as numerous as the possible changes which may be evolved in a series of thirty-two units—which of course is almost beyond computation. As a general rule, the more difficult the case the greater the need for taking a plaster impression. For those cases in which posterior teeth are remaining, orthodontia trays are indicated. (This statement will fall as a hard blow to many who would like to find an easy way, but after the technic is mastered there is no easier way.) Where there are two or more intervening spaces to be supplied, the articulated casts are mounted on the articulator and the porcelain teeth ground and set up to close approximal contact with the adjacent plaster teeth; the case is then waxed up and the usual procedure of vulcanizing carried to completion. The case is finished to the sand papering and carried to the mouth and back to the lathe repeatedly and cut freely until the intricacies of its insertion are mastered. The teeth are now removed from the vulcanite by heating over a small alcohol flame, the holes left in the vulcanite by the pins are enlarged with a large bur and the teeth reset with hard wax. That portion of the plate conforming to the tissues is now cut away and modeling compound in stick form is applied with dry heat, and a removable impression is taken of the ridge and adjacent teeth. The case is now waxed up and invested, the flask opened and everything except the teeth taken out and thrown away. New rubber is vulcanized and when the case is finished it goes to place as did the plate impression.

For a case in which there are six or eight of the anterior teeth standing, the method of taking the impression is very similar to that used in taking full upper or lower impressions. Take for example a case where the patient has in the upper jaw six anterior teeth and the first bicuspids. To provide an efficient restoration for this case, the method of procedure, simplified as much as possible, is as follows: Select an over-size tray similar to that used for a full upper impression and fill with Hall's Black Impression Tray Compound. The impression is taken without endeavoring to secure detail on the labial and buccal borders of the teeth. Removing this impression from the mouth it is chilled and then removed from the tray. To meet the requirements of an almost perfect tray the impression is trimmed to meet the needs of the individual case, being thinned down to the cervical margins of the teeth, since there is no attempt to obtain an impression of these. The Hall technic for full impressions is then followed in detail. This is, in substance, as follows: Hot water, potassium sulphate and cast plaster are mixed very thin and stirred constantly until setting begins, when it is introduced into the fashioned tray and settled into position. Dr. M. M. House, of Indianapolis, in this connection found that cast plaster used, together with potassium sulphate, sets under saliva and slowly enough to allow time for careful manipulation. After it has set, the impression is removed from the mouth, and after drying for fifteen or twenty minutes is coated with an alcoholic solution of shellac which serves as a filler; when this is dry it is further coated with an alcoholic solution of sandarac to give a smooth surface. The casts are now poured with Stewart J. Spence's plaster compound—in such a way as to obviate the necessity of trimming the flint-like casts —the impression having been boxed up previously with Harbutt's plasticine (kindergarten modeling material), in order to provide a convenient matrix. Upon the cast a bite plate is constructed of Graft's base-plate compound and hard pink wax. This is taken to the mouth and the bite secured, and at this sitting an impression of the lower is taken in modeling compound. This cast from the lower is placed in position on the bite plate and mounted on the articulator. Just before the teeth are placed in position, a piece of Ney's oro elastic gold for each side is flattened at one end and bent at right angles and heated, then incorporated in the Graft's base plate, just anterior to the first tooth on the plate, the free ends extending in a buccal direction about a half inch. Another piece is extended along the side of the cast in the direction of the central incisor. This piece is called by Dr. W. E. Cummer, of Toronto, an "indirect retainer." It serves as a lever to prevent the plate from dropping down into the mouth. (How it serves this purpose will be shown in the clinic.) The teeth are now set up to proper occlusion and the case vulcanized. When finished and polished it is taken to the mouth where, with a round-nose plier, the wire is bent to conform to the neck of the tooth.

Where the clasp is not to be rigid, the writer prefers a wire one, since subsequent adjustments, when necessitated as a result of settling, may be more easily made. The writer further observes that in the clasp formed with pliers or peened out of sheet clasp gold, there is really but one line of serviceable contact about the circumference of the tooth, no matter what the width of the band. In other words, the open-end, hand-made clasp does not fit like a ferrule on a cane—and this is no reflection upon skilled workmanship; the securing of such adaptation is simply a physical impossibility. The wide clasp has the additional disadvantage of harboring the products of fermentation, which constitute the one factor known to be responsible for the disintegration of the tooth substance. It is a common belief among dentists that to clasp a tooth means to destroy that tooth through abrasion within a few years' time—another erroneous belief. The fact that a natural cusp when in antagonization with a platinized hard gold inlay does not suffer, but on the contrary makes marked impression upon the surface of the inlay, supports our observation that a belief in the destruction of teeth through clasp abrasion is unfounded. It may be relevant at this point for the writer to suggest that he prefers and teaches in the construction of form-fitting clasps, the employment of a method which does not suffer through an individual's faulty finger technic. This preferred method avails itself of the laws of physics, and is none other than the one utilized in casting gold inlays. Further specific reference to this method is embodied in the following presentation of the "grasshopper-leg adjunct:"

The grasshopper-leg adjunct is not itself an attachment, but it is an adjunct to the snug-fitting clasp or removable attachment such as the split-pin or split-bar types. Credit for the invention of this device is difficult to assign, but your essayist has been employing it with varying degrees of success during the past five or six years. During this period the highest grade of clasp gold on the market has been used in its construction, but the limit of elasticity of all grades was soon reached and the molecular tension developed under constant use caused the leg to break at the knee. This difficulty has been eliminated since the introduction of elastic gold according to Louis J. Weinstein's formula. This gold is found to possess the "spring" quality necessary to assure the grasshopper-leg adjunct a permanent place in prosthetic dentistry and win for it increasing favor in connection with minor removable restorations.

The function of this device is not to compensate for settling, but is rather a provision for the resiliency of the tissue in the area underlying the base. The stress of mastication is distributed between the spring and the mucosa, the stress falling first upon the spring, which, yielding, allows the stress to be exerted finally against the mucosa itself; as soon as the stress is removed the spring is released from its state of tension and the mucosa then returns to normal. Thus, this adjunct allows the mucosa to remain normal and therefore requires in the clasp or other device no subsequent alteration such as is required when the tissues permanently recede. Another advantage almost too obvious to mention attends the use of this adjunct, namely, the absence of harmful leverage on the abutment tooth, since we are enabled to direct the force of mastication along a line more nearly parallel with the long axis of the tooth.

The construction of clasp and leg is, briefly, as follows: An inlay-investment reproduction of the tooth to be clasped is waxed up to include two opposing convex surfaces and an occlusal rest. The tooth and wax pattern are then invested and the usual inlay procedure is followed, except that a twelve-per-cent., platinum-alloyed gold is used, which properly may be designated as clasp metal. The secret of success in casting clasps lies in casting them at the lowest temperature possible, since incandescence permits a destruction of the balanced relationship among the elements of the clasp metal.

The leg is constructed in most instances of 16-gauge Ney's oro elastic gold wire. After bending the wire at right angles it is annealed and further bent back upon itself, and the whole adapted to meet the needs of the individual case, one end being soldered to the clasp and the other end left free until assembled in the mouth. The base to receive the clasp is waxed up with hard pink base-plate wax, the procedure being the same as that followed preparatory to taking the bite, except that a space about ten millimeters in width is left between the wax and the abutment tooth, that is, the tooth which is to receive the clasp. The clasp is placed in position on the tooth and the base is inserted; the patient is requested to close and the base is settled into place; plaster is now inserted between the abutment tooth and the base, and this relation maintained until the plaster is hardened sufficiently to be removed. The whole is invested in bridge investment material and the lower portion of the leg soldered to the lingual bar of the gold base—or in the event of a vulcanite base, the lower portion of the leg is extended back into the rubber sufficiently to insure stability when vulcanized.

The fact that the grasshopper-leg adjunct may be used with any unyielding appliance in order to assist in preserving resiliency is, perhaps, its highest recommendation.

729 Shukert Bldg.

It is characteristic of the really big men that they can always find time to do the things they want to do.

AIDS IN THE TREATMENT OF FRACTURED JAWS*

BY VARNEY E. BARNES, D.D.S., CLEVELAND, OHIO

FIRST AID principles are: Check bleeding; keep wound clean; immobilize. In the reduction and retention of fractures of maxilla and mandible, the skillful manipulation which results in occluded teeth will in most cases check the bleeding and tend to maintain cleanliness of the wound in the greatest degree by allowing drainage and outer bandaging independent of the splint, which immobilizes the fracture.

The immobilization in all cases where possible must be made by fastening the teeth of the fractured jaw to the teeth of the unfractured or lesser fractured jaw. Where both jaws are fractured and the teeth and bone are lost, it will be found necessary to fix the teeth in the arch of the lesser fractured jaw, restoring the arch with splints or bands and bars; then with similar and more extensive appliances the teeth in the jaw of the greater fracture may be ligated, preferably with tough brass wire, but silver or silk or linen may be used. Metal is much more sanitary. Immobilization and reduction of fractures should be made as soon as possible after the injury and the method should, wherever possible, avoid the use of facial and fabric bandages.

The wiring of the teeth of one jaw to those of the opposing jaw is the quickest, surest and possibly the most sanitary method which can be used (*Fig. 1.*) The success of this method depends largely upon the ability of the operator to recognize the condition of the occlusion of the teeth prior to the accident, and then so fitting wire ligature (.020-inch) about all available teeth that he and his assistants can pull, press and force the teeth to that prior occlusion (normal or abnormal) and fix them there by twisting the wire ends

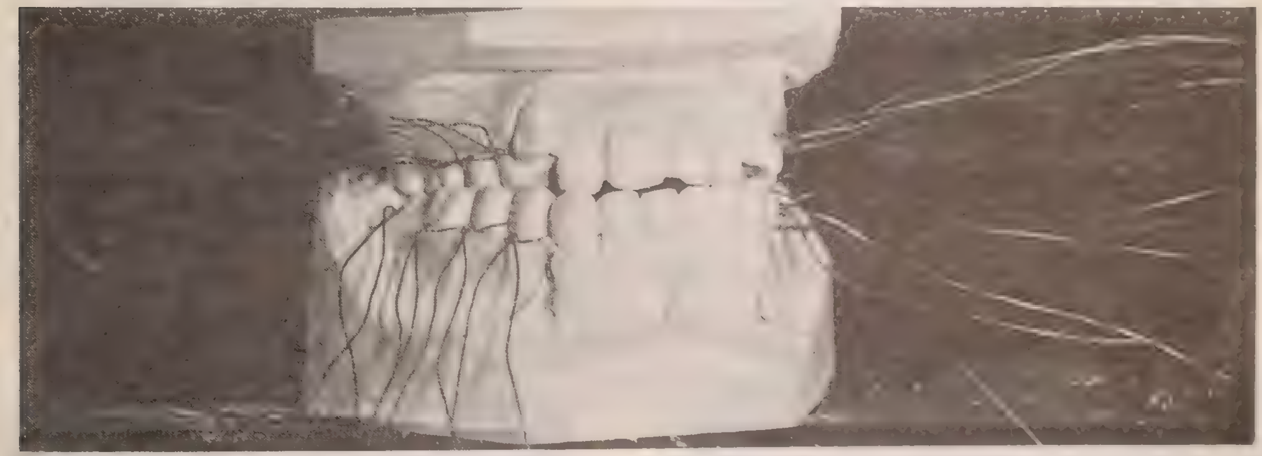

Fig. 1

Fig. 1 shows long heavy brass ligatures twisted about teeth and ready to be used in setting and immobilizing fracture.

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*Read before the Northern Ohio Dental Society, 1917.

(*Figs. 2, 3 and 4*) so that they may be tightened from time to time to maintain immobilization. This occluding of the teeth, of course, maintains the jaw segments in the approximate positions and union may then proceed, or

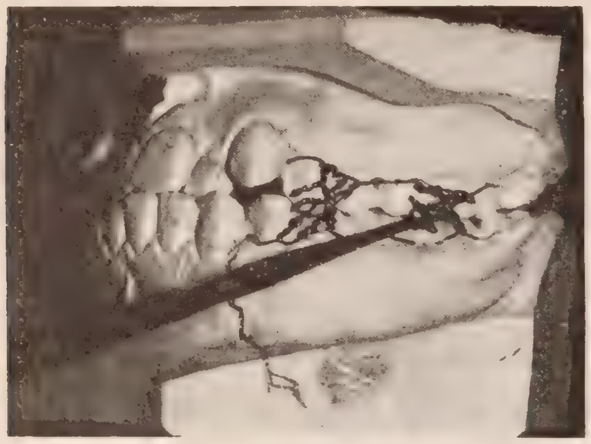


Fig. 2.

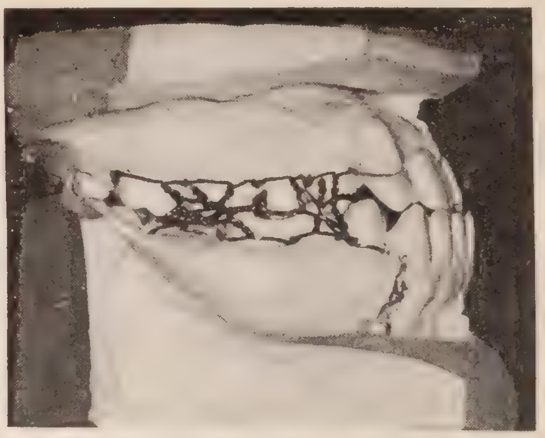


Fig. 3.

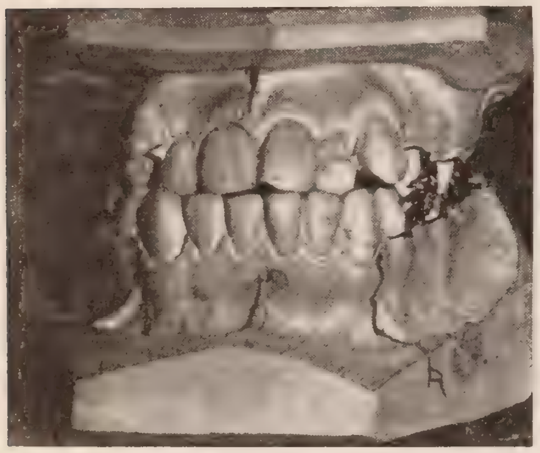
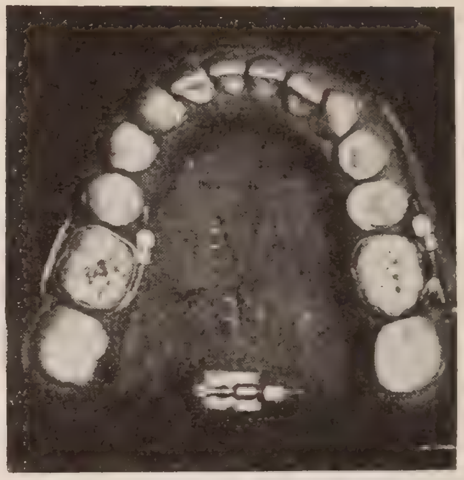


Fig. 4.



Figs. 5A and 5B

Figs. 2, 3 and 4 show ligatures of Fig. 1 after they have been twisted to reduce and immobolize fracture. Incisors are not shown ligated as usually done.

additional treatments necessary in compound fractures may be proceeded with without the irritation which might be produced by jaw or segmental motion. The fixation of the mandible to the maxilla gives the surgical rest which is necessary to proper healing or for additional treatment.

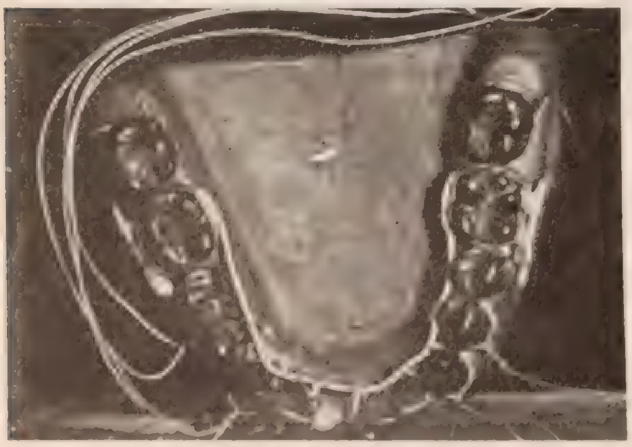


Fig. 6

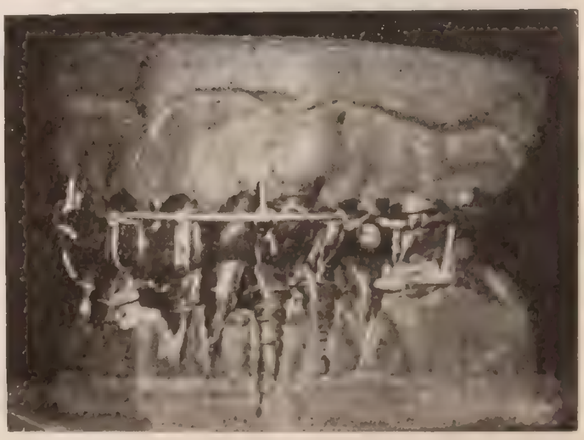


Fig. 6A

Fig. 6 shows new clamp fracture band with bar extensions used in conjunction with other bands and bars and also ligatures as in Figs. 6A, B and C.

Paraffine, impression compound, cotton and gum may be used as protection to cheeks where wires or bars might irritate. (*Fig. 7A.*)

A NEW FRACTURE BAND

Wire ligatures cannot always be used successfully, first, on account of too great maceration or comminution of bone and soft tissues; second, in case of too great loss of teeth or section of jaw bone; third, the teeth may be so ill-formed with but slight cervical constriction so as to cause a twisted ligature to slip. In such case bands or bands and bars or metal or rubber splints may be required. (*Fig. 5 and Figs. 5A and B.*) A new band devised by the speaker consists of a clamp band in which the threaded bar carrying the size-controlling nut is long enough to extend mesially and distally, forming a sort of cleat about which wire or ligatures may be twisted from the bands or the teeth in opposing jaws. (*Fig. 5B.*) The band may have nut fitted on lingual and a buccal wire cleat used which, on the lower teeth, will be found more satisfactory. *Bands should be cemented for sanitary reasons.* Extension bars may be soldered to the mesial or distal extensions of the threaded bar or buccal bar. (*Fig. 6.*)

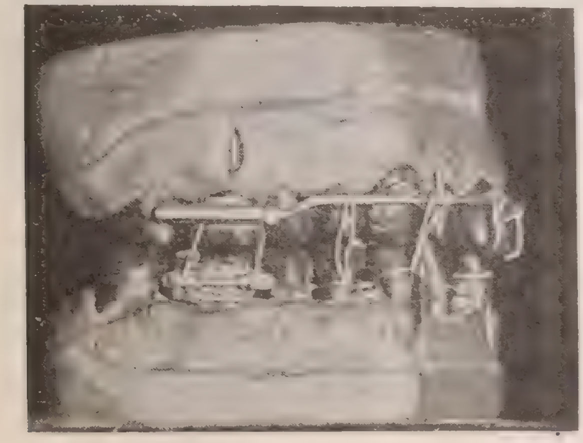


Fig. 6B

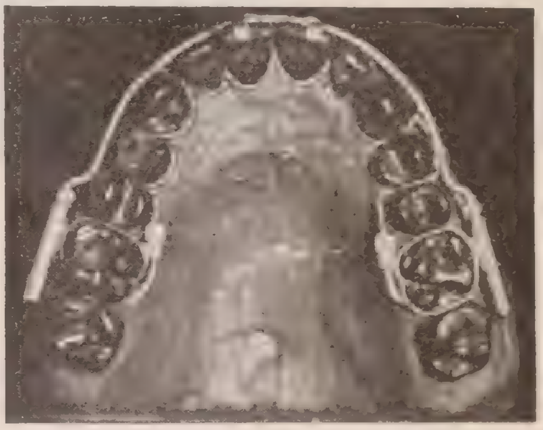


Fig. 6C

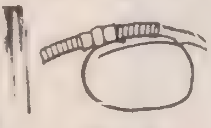


Fig. 5

MODIFIED METAL SPLINTS—*Fig. 7.*

Where time and facilities permit, the metal splint may be found to be of very great utility. This may be made at once from metal dies obtained

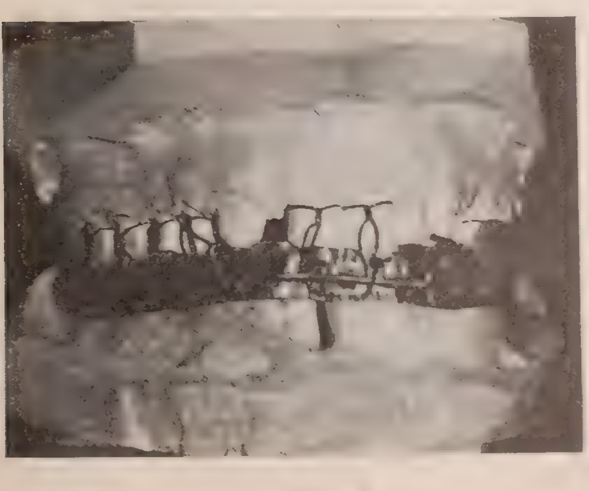


Fig. 7

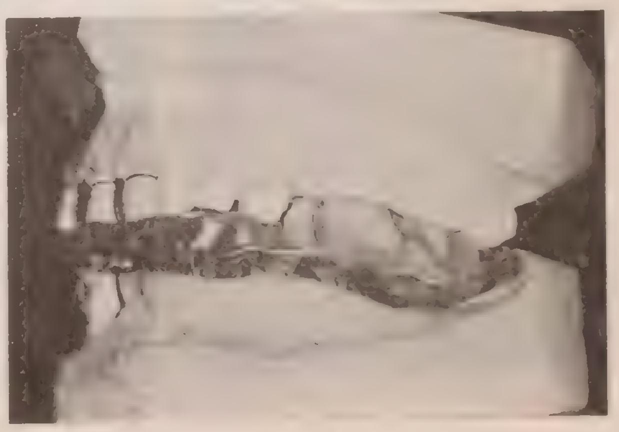


Fig. 7A

from plaster of Paris impressions of both jaws, the plaster casts being made to duplicate the conditions of deformity due to the fracture (*Fig. 8*). Then the casts are cut at the points of fracture and are occluded with the teeth of the uninjured or splinted jaw, and the pieces are then waxed or plastered together (*Fig. 9*). Over this re-occluded or repaired cast, tin foil, heavy No. 60, is formed or rubbed over the teeth carefully and closely on the occlusal surfaces and buccal curvatures of the teeth and approximately only over the cervical, lingual surfaces and approximate spaces so that undercuts of con-

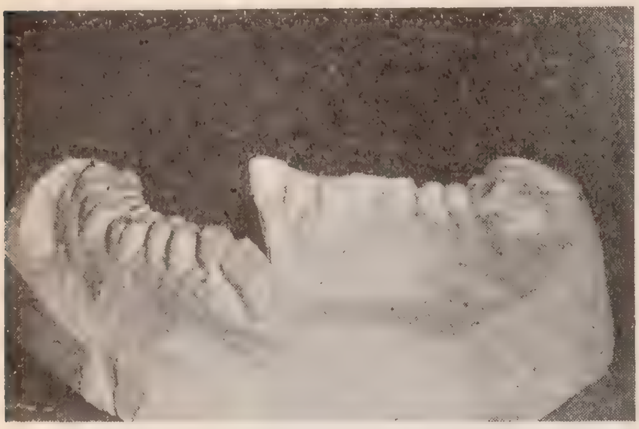


Fig. 8

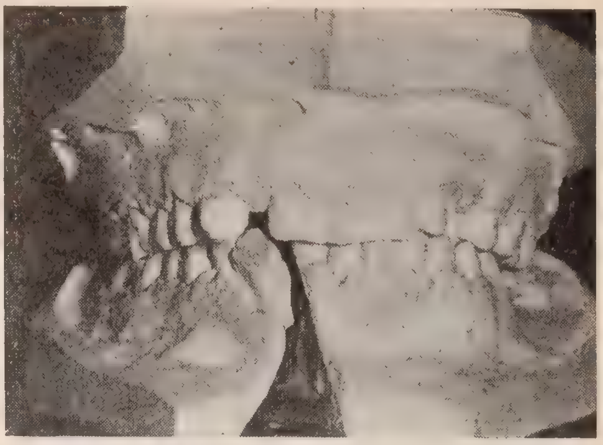


Fig. 9

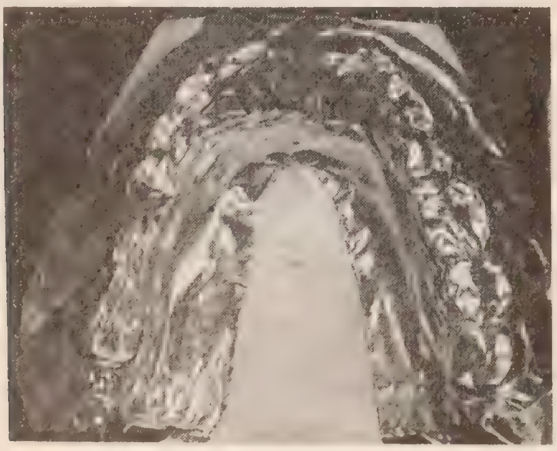


Fig. 10

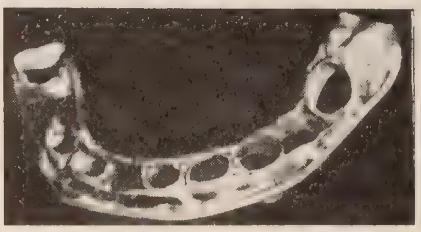


Fig. 11

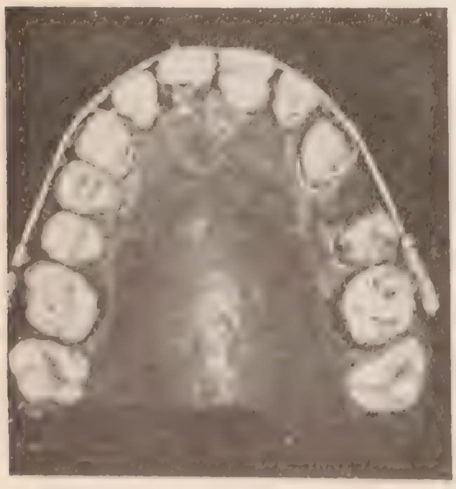


Fig. 12

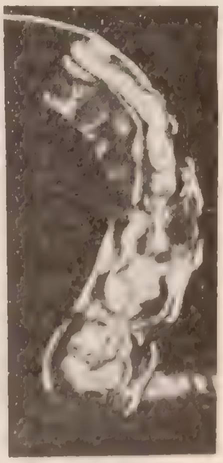


Fig. 13

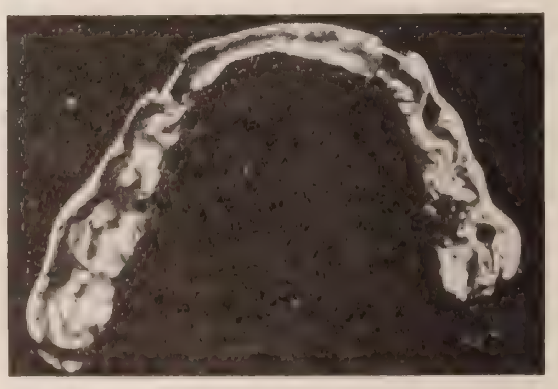


Fig. 14

tour may not be entirely reproduced in the die which is to be made from this tin foil-covered cast, which is pressed into the molding compound and dropped out (*Fig. 10*). The approximate die made from this mold is then used to swage up a metal splint built up from several pieces in layers which overlap here and there. The metal used, .005-inch, .006-inch. Nickel-silver, brass, gold or platinum pieces soldered together, reswaged, soldered more strongly and then bound buccally with 18 or 19-gauge round wire, which approximately follows the gum contour but misses it regularly or at every other tooth interval, to form a loop or space into which a wire ligature may be placed or cleats may be soldered at intervals to allow for the easy fixation of ligatures from teeth in opposing jaw. (*Figs. 6, 6A, 6B, 6C, 7, 7B, 11, 13 and 14.*)

Fig 7B

The splint which I have used is made to cover the gingival margin and go one-sixteenth to one-eighth inch beyond it *over the gum tissue and is cemented at time of setting fracture.* Ames' oxyphosphate of copper cement will maintain asepsis and when removed will reveal healthy, pink gum tissue, if the splint is cemented to teeth and gums

One gr. potassium permanganate to one-half pint water every hour or so will keep mouth clean in most cases.

The metal splint may often be quite successfully used after the case has been held with wires for about three weeks. Then the impression for splint may be taken and the splint made, without the great rush which is necessary at the first fixation of a fracture. The splint then can be cemented, wired to the opposing teeth and immobilization of mandible continued for a week or two longer; then the wires may be cut and the patient allowed to begin careful chewing. These splints should be pierced so as to allow excess cement to escape and to allow operator to see tips of teeth and be certain that splint is in place when set.

Successful splints may be made of several plain bands fitted to teeth and connected labially or lingually or both by 16 or 17-gauge metal bars soldered to them (*Fig. 11*). This soldering should be strong but rather light, that is, it should not spread over the surface of the bands to any great extent, because such spreading or heavy soldering destroys the flexibility of the bands and will usually prevent the easy application of the splint.

Figs. 12, 13 and 14 show metal splints of different types which have been used in practical cases which were entirely successful; intermaxillary wire ligatures were used with these appliances.

The X-ray is quite advisable to note fracture lines; also possible complications of infection from suspected or unsuspected blind abscesses. Refracture those cases where partial union takes place incorrectly. Do not use interdental rubber splint except in edentulous mouth, or where anything else can be used.

867 Rose Building.

PREPARATION OF CAVITIES FOR GOLD INLAYS*

BY W. H. O. McGEHEE, M.D., D.D.S., CLEVELAND, OHIO

FRANCIS BACON has said that "the greatest trust between man and man is the trust of giving counsel." Ralph Waldo Emerson is responsible for the following immortal words: "He teaches who gives, and he learns who receives. There is no teaching until the pupil is brought into the same state or principle in which you are; a transfusion takes place—he is you, and you are he; then is a teaching, and by no unfriendly chance or bad company can he ever lose the benefit."

I have traveled over eight hundred miles in order that we may take counsel together this evening on a very important question. The pleasure of entering the borders of this grand and historic old state for the first time and of being here as your guest, is very great. I come as much to be taught as to teach, and I would request, then, that this transfusion of thought and personality of which Emerson speaks be accomplished at once, and that we for the next hour commune together. Let my audience during my discourse and in the discussion which is to follow, become the teacher, and I shall become the pupil. Then will we indeed both be fully repaid for the efforts expended and the thoughts elicited.

There is no phase of dentistry which is of greater importance to the general practitioner than that of cavity preparation. Inasmuch as the daily work of the average dentist is largely concerned in the adaptation into prepared cavities of filling materials for the restoration of lost tooth structure, it might almost be considered the keynote to successful dental practice of today. If the cavity be improperly prepared, if the foundation be formed along incorrect lines, the superstructure—the filling material—will be placed on insecure ground and will easily succumb to the stresses later to be brought to bear upon it.

The great majority of men conducting a modern dental practice are supposed to have some theoretical knowledge of the laws governing correct cavity preparation; and yet any one who is observant of conditions will readily agree with the statement that there are really comparatively few who are daily carrying out in detail these laws. This is in a way an astounding statement, and a sad commentary on the frailties of human nature. Nevertheless, my experience has been that it is true.

I have been engaged in the rather prosaic occupation of teaching dentistry for a period of about nineteen years. During that time it has fallen to my lot to see many cavity preparation operations performed by students, as well as a large number of defective fillings which have been placed in cavities prepared by dentists. During that period I have observed that the tendency of the average dental student is to slight his cavity preparations if he is given the opportunity; and I have grown to be'ieve that the average dentist will do the same thing in many instances. Has the profession the moral right to do this? An imperfectly-prepared cavity is soon hidden by the filling material placed in it, it is true, and I believe that this is the obviously poor argument uppermost in the mind of the man who performs the defective operation. I believe that this is one of the most frequent causes of failure of filling operations as well as of unsuccessful careers as dental practitioners.

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*Abstract of an address delivered at the meeting of the Florida State Dental Society June 20th, 1917.

Cavity preparation was a number of years ago placed on a definite scientific basis by the lamented G. V. Black and his co-laborers, and I sometimes feel like offering an apology to my hearers when I am invited to discuss the subject. Remembering the above facts, however, I have gradually arrived at the conclusion that it is only by frequent discussions and repeated demonstrations that the importance of correct cavity forms can be impressed on dental audiences. The failure of many of the profession to appreciate the importance of the subject, can to my mind, be attributed to one of two factors, that is to say, either ignorance of the laws of cavity preparation or to carelessness in regard to the evils resulting. For the first condition there can be no excuse, since these laws may be learned readily by consulting any modern textbook on operative dentistry. "Ignorance is the curse of God; knowledge the wings wherewith we fly to heaven." There is no profession in which minutæ of detail is of greater importance than in the profession of dentistry. This being the case, then, I take it that the sin of carelessness is one of the greatest shortcomings of which the dentist possibly could be guilty. A recent writer is responsible for the following remarkable effusion:

"I am more powerful than the combined armies of the world.

"I have destroyed more men that all the wars of the nations.

"I am more deadly than bullets, and I have wrecked more homes than the mightiest of siege guns.

"I steal in the United States alone over $500,000,000 each year.

"I spare no one and I find my victims among the rich and the poor alike, the young and old, the strong and weak. Widows and orphans know me.

"I loom up to such proportions that I cast my shadow over every field of labor, from the turning of the grindstone to the moving of every railroad train.

"I massacre thousands of wage earners in a year.

"I lurk in unseen places, and do most of my work silently. You are warned against me, but you heed not.

"I am relentless.

"I am everywhere—in the house, on the streets, in the factory, at railroad crossings, and on the sea.

"I bring sickness, degradation and death; yet few seek to avoid me.

"I destroy, crush, or maim; I give nothing, nothing—but take all.

"I am your worst enemy.

"I am *Carelessness.*"

It seems to me that it behooves us to become more deeply imbued with the idea of service—service to our patients, service to our profession, service to humanity, if we would avoid the consequences of this major sin and desire to bring out our highest capabilities as professional men. Then, and then only, will careless operating and slipshod cavity preparations be things of the past.

Cavity preparation for the gold inlay differs very little from that for a gold filling, except in the method of retention and the time for providing for it. It is exceedingly important, if the best results are to be obtained, that adequate access be provided for by producing sufficient separation of the teeth. This is a point which is frequently neglected, resulting in increased difficulty in withdrawal of the wax pattern and marring of the contact point, as well as obscuring the view of the cavity and interference with proper instrumentation. If sufficient separation be obtained, it will not be necessary to contour the wax model tightly against the proximating tooth in proximal cavities.

There has been quite a discussion for a number of years as to the advantages and disadvantages of the gold inlay, the advocates of the gold filling claiming closer adaptation to cavity walls and a gripping of the filling in place by the normal resilience or elasticity of vital dentin, as well as the absence of the cement line; whereas the champions of the gold inlay cite the great time-saving and energy-preserving properties incident to the construction of the inlay. The great majority of failures with the gold inlay undoubtedly have been due to lack of appreciation of the importance of correct cavity preparation, and to their use under improper conditions and in wrong localities. If the cavity be properly prepared, the inlay will be either locked into place by the dovetail form of the cavity itself, or be held in position by pins placed in proper localities. Too much reliance is frequently placed on the adhesive properties of the cement to retain the inlay in position. The cement should be used only as a sealing agent for the joint between the inlay and the cavity wall. In addition to this, if the cavity margin be strongly beveled, as it should, and the margins of the perfect inlay efficiently burnished, the underlying cement will not only be entirely covered, but will be protected from the entrance of saliva by the overlying gold.

The prime objects to be kept in mind, then, during the construction of the inlay are, first, proper cavity preparation; second, restoration of lost contour and occlusion, and third, complete covering of the cement at the margins through adequate burnishing of the thin edge of the inlay over the obtuse marginal bevel.

The indications for the gold inlay may be mentioned as follows:

First: For restoration of abraded incisal and occlusal surfaces.

Second: For large contour restorations in badly broken-down posterior teeth, as a substitute for the shell crown.

Third: As a time saver when it becomes necessary to construct a number of fillings in a limited time.

Fourth: In cavities in which the continued exclusion of moisture for lengthy operations is impossible.

Fifth: In invalid, convalescent or young patients, unable to bear prolonged gold-building operations.

Sixth: In teeth with weakened peridental membranes.

Gold inlays are not indicated in small cavities, or shallow cavities whose outline is not extensive. They are also, in the majority of cases, contra-indicated in proximal cavities not involving the angle, unless these are large and the lingual wall has been lost, thus allowing ready withdrawal of the wax model and insertion of the inlay from the lingual aspect.

The steps in cavity preparation may be reviewed as follows:

First: Establish the outline form.

Second: Remove the decay.

Third: Give the cavity form. (*a*) Convenience form; (*b*) resistance form; (*c*) retention form.

Fourth: Bevel and polish the enamel margins.

Fifth: Perform the toilet of the cavity.

Although there is frequently an overlapping of these steps, and sometimes a reversal or change in the order of procedure is deemed advisable, it is important that these steps be constantly kept in mind and that each one be made as nearly correct as possible, if a perfect result is to be obtained. We will briefly discuss these various steps in order that the special procedures with reference to proper preparation for reception of the inlay may be brought out.

1. Establishing the Outline Form: The same rules for extension of cavity margins as are laid down for other classes of fillings are applicable here, including all fissures and deep developmental grooves in the main cavity, and extending all gingival margins under the free gingiva. The law of extension for prevention or "cutting for immunity" should be followed in all instances where no modifying conditions exist, but should never be carried to excess simply as a convenience form to facilitate withdrawal of the wax model. Access should rather be gained, as previously stated, through adequate separation.

2. Removal of Decay: Much of the decay has been removed during the performance of the first step. It should now be given thorough attention, the walls of the cavity closely scrutinized and cleared of all traces of carious matter.

3. Giving the Cavity Form: (a)*Convenience form*—The major part of convenience form should always be gained through separation of the teeth and not through extension of cavity walls. No convenience points on the gingival or pulpal walls as for gold fillings are required or advisable.

(b) *Resistance and retention form*—Lack of proper resistance form is one of the most frequent causes of failure of the inlay. As tested by the gnatho-dynamometer, the teeth are, during mastication, being constantly subjected to stresses ranging from seventy-five to two hundred and fifty pounds pressure and in exceptional instances to as much as three hundred pounds. This being the case, it is necessary that the filling be as firmly seated as possible in order that these stresses may be resisted to the utmost. In all lines of mechanical work the general form of a cavity which is to receive an inlay, is the box or mortise. In this form all of the walls of the mortise present plane surfaces, joining each other to form definite line and point angles. The mortises adapted for inlay work are the simple mortise on one surface (represented in *Fig. 1*), and the compound mortise (step form), seen in *Fig. 2*. To facilitate withdrawal of the wax pattern the lateral walls may be very slightly flared outward instead of being allowed to remain parallel, as they would be for a gold filling. One or the other of these forms may be modified and adapted to the preparation of most inlay cavities. *Figs. 3 and 4* show examples of the simple mortise on one surface. The class of cavities represented are, however, not ideal localities for gold inlay work and should be filled with cohesive gold. *Fig. 5* represents the simple dove-

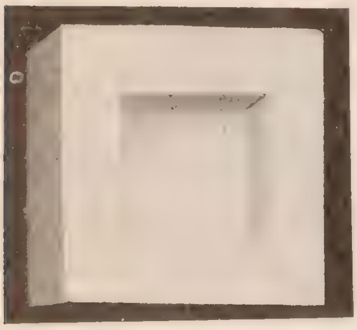
Fig. 1

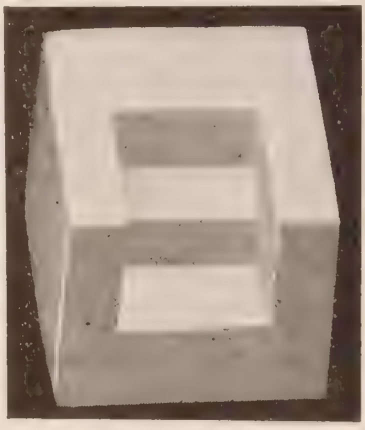
Fig. 2

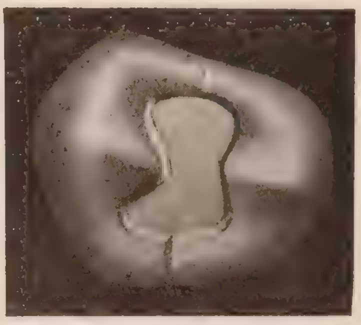
Fig 3

Fig. 1—Simple mortise on one surface.
Fig. 2—Compound mortise.
Fig. 3—Occlusal cavity on bicuspid.

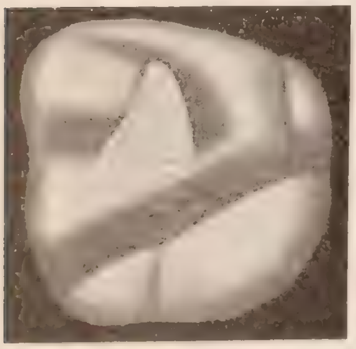
Fig. 4

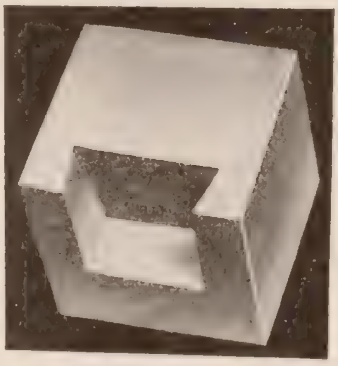
Fig. 5

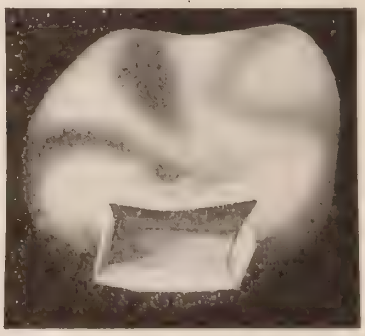
Fig. 6

Fig. 4—Occlusal cavity on molar.
Fig. 5—Simple dovetail mortise on two surfaces.
Fig. 6—Simple dovetail mortise on two surfaces.

tail mortise involving two surfaces, and *Fig. 6* very clearly indicates the manner of its adaptation to proximal cavities on bicuspids and molars where the occlusal fossæ and grooves are not involved and the strength of the buccal and lingual walls will admit of its adoption. However, in the majority of instances of proximal cavities on anterior or posterior teeth, the compound dovetail mortise is ideal, resulting in locking the inlay into place so that it does not have to depend on the adhesive properties of the cement to hold it in position. Resistance form is gained by the use of the compound mortise (see *Fig. 2*) with its flat seat and plane surfaces, while retention is largely provided for by transforming it into the compound dovetail mortise, thus keying the inlay into position so that all lateral stresses may be resisted to the utmost. (See *Figs. 14 and 21.*)

In addition to the use of the dovetail, retention is in many instances accomplished by the use of 20-gauge pins of platino-iridium, platinized gold or gold-plated tungsten. Of these, the latter is much the strongest and at the present market price of platinum, by far the cheapest. The probability is if the war continues for any length of time, the use of platinum in dentistry will be temporarily prohibited. In cases of vital teeth the pins may be placed on gingival, incisal and pulpal walls, as the case may be, paralleling them and making sufficient provision for easy withdrawal in the wax pattern; while in devital teeth the pulp chamber and canal is utilized for this purpose. Accentuation of the gingival and pulpal point angles also may be resorted to for retentive purposes in many instances. The deepening of these point angles is not made at the expense of the axial walls, as is done for cohesive gold, but rather at the expense of the gingival or pulpal wall to allow for proper "draw" of the wax model. (See *Figs. 18, 20 and 23.*)

In all cases additional retention form may be provided by removing from the under surface of the wax pattern sufficient amount of wax to give the cement a better grasp on the inlay and also by undercutting the walls of the cavity for the same purpose. Instead of filling in undercuts in the cavity during its preparation with cement, it will often be found good practice to use for this purpose wax of a different color from that of the pattern. This may be made thoroughly smooth and oiled, so that the wax model will not cling to it during its adaptation and withdrawal. After the inlay is cast and ready for setting, this wax should be removed, thus affording additional retention by means of an increased body of cement. Wax may also be used for adaptation against weak buccal and lingual walls, to be removed just before setting the inlay, in that manner relieving the strain on these walls during the act of fitting and setting it.

4. Beveling and Polishing the Enamel Margins: There has always been much discussion in regard to the question of the advisability of beveling the enamel for gold inlays; some authorities advocating what is known as the "butt joint," while others as strongly advise beveling the margin. The chief disadvantage claimed for the enamel bevel is the increased difficulty of adaptation and withdrawal without marring of the wax pattern over long

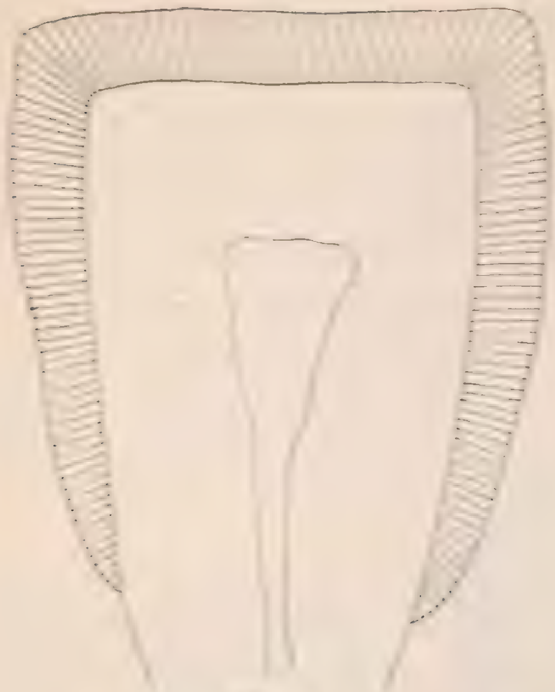

Fig. 7

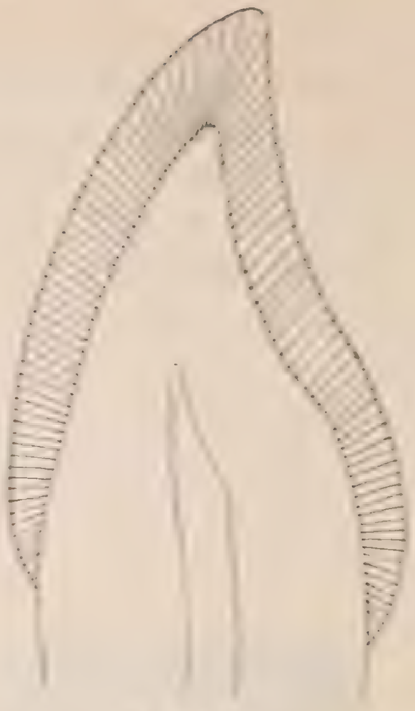

Fig. 8

Fig. 7—Diagrammatic drawing showing direction of enamel rods on a central incisor.
Fig. 8—Lateral aspect of same tooth seen in figure 7.

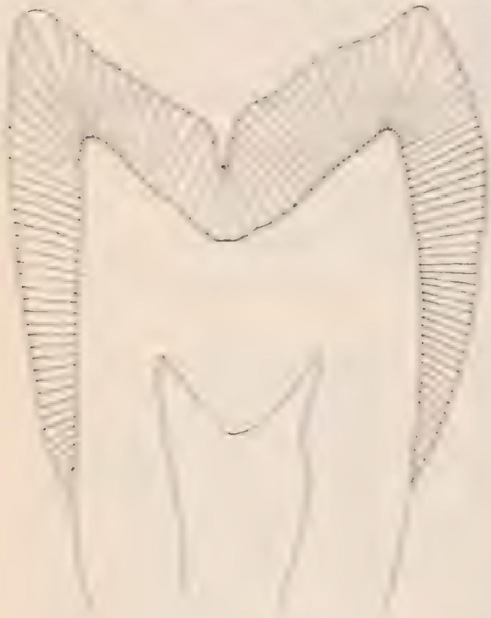

Fig. 9

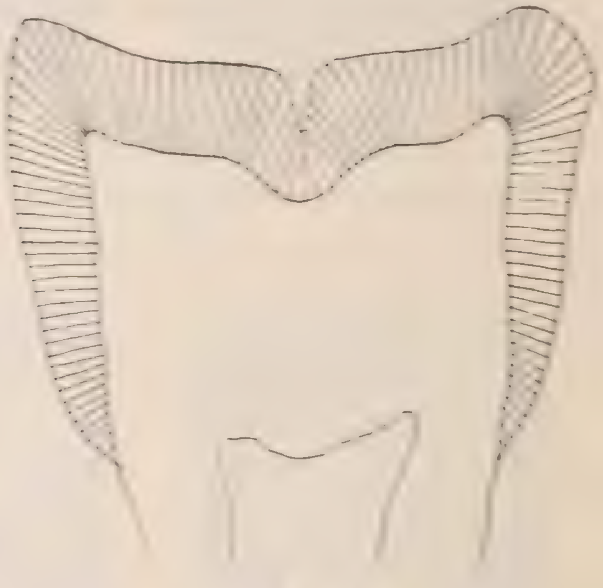

Fig. 10

Fig. 9—Direction of rods on a bicuspid.
Fig. 10—Direction of rods on molars.

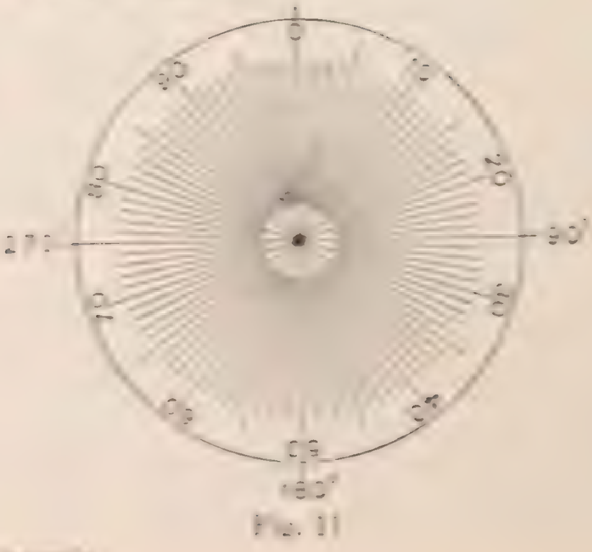

Fig. 11

Fig. 11—Goniograph scale.

bevels. However, if one thoroughly understands the direction of the enamel rods in the various localities and the danger of fracture of the outer ends of these rods under the stress of mastication, there can be no doubt of the advisability of protecting these weak areas by strong bevels. In addition to the protection afforded the cavo-surface angle by an adequate bevel and the consequent overlapping of the gold in these areas, another strong argument for beveling the margins is the fact that when the inlay is cast and seated to place, a thin beveled edge will admit of thorough burnishing, the securing of a more perfect adaptation, and the elimination of the cement line— that weak point in inlay construction. If the cavo-surface angle be protected by the overlapping margin of the inlay, there is also much less danger of fracture of enamel rods during the burnishing process. *Figs. 7, 8, 9 and 10* show diagramatic drawings of the direction of the enamel rods in various localities and accentuate the necessity for adequate beveling. The beveling should be done in most instances with chisels of razor-like sharpness. However, on buccal and lingual margins of proximo-occlusal cavities, the additional use of fine-cut discs is often advisable to produce a high polish and eliminate the tendency toward roughness of the wax model, produced by withdrawal of the wax against these rough margins. If this be not done and a high power lens be used on the wax pattern, little projections may be seen pointing gingivally, produced by withdrawal of the wax against these roughened surfaces, resulting in an imperfect fit of the inlay. In beveling, the cavo-surface angle should be made obtuse and the bevel angle should not be very deeply buried, resulting in a long, thin bevel and a feather edge to the metal, which may then be readily burnished. The bevel should, in the majority of instances, extend about one-fourth to one-third the thickness of the enamel cap and should range from six to ten centigrades outward. *Fig. 11* shows the centigrade circle with the indicated bevel.

5. Performing the Toilet of the Cavity. On the completion of the cavity preparation, which always should be conducted with absolute exclusion of moisture whenever possible, the walls should be thoroughly inspected for any remaining decay. All debris should be removed with the chip blower and the walls thoroughly swabbed with dry cotton or spunk, after which the chip blower should be used again. After the wax pattern has been completed and removed, all traces of wax and salivary secretions should be removed with a bath, first of chloroform and then of alcohol. Herein lies the greatest weakness in the use of the inlay, since the most permanent results are always obtained if fillings are placed against freshly-cut surfaces. This latter procedure is obviously impossible in inlay construction, as it would destroy the perfect adaptation of the inlay and has of necessity to be dispensed with.

A study of the accompanying illustrations will elucidate the points brought out in the discussion of this subject. Most of the enlarged plaster forms and much of the artist's work on the photographs used for these illustrations are the work of Dr. Flora M. Haag, to whom I desire publicly to acknowledge my thanks.

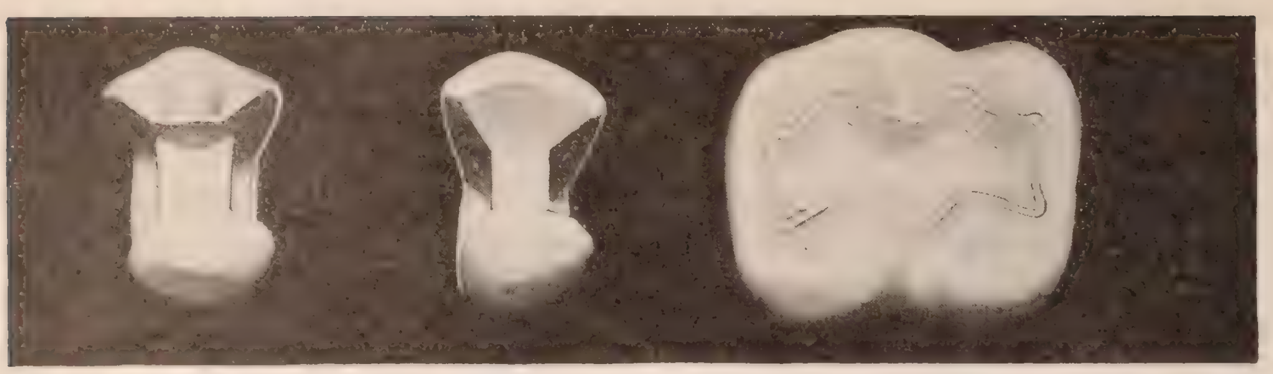

Fig. 12

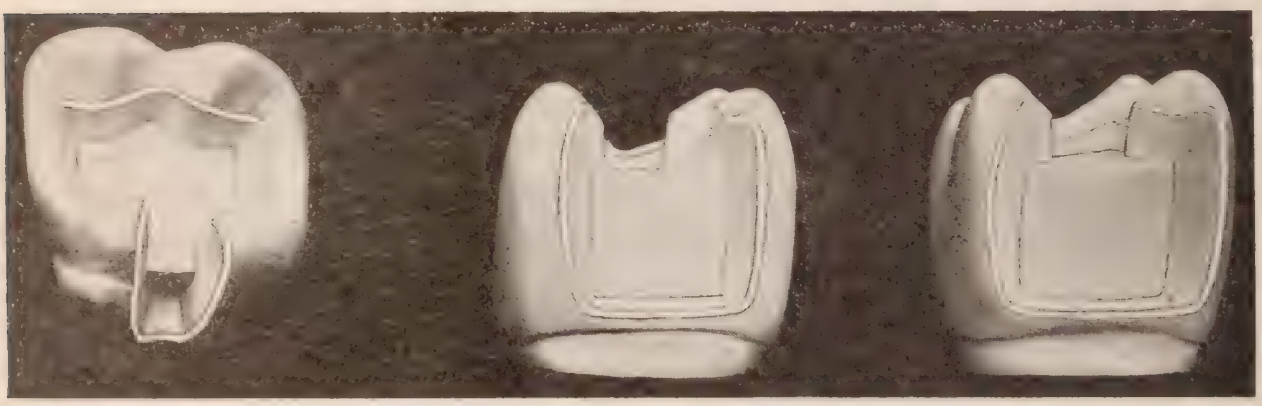

Fig. 13

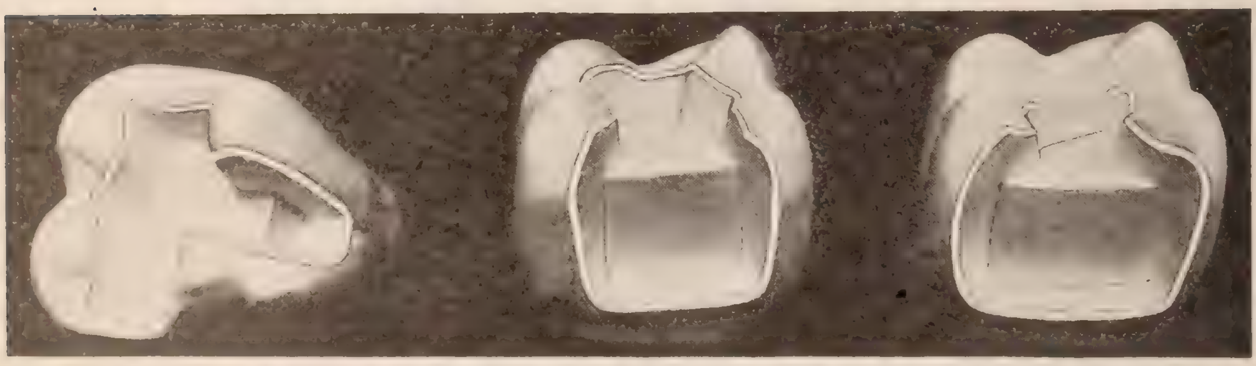

Fig. 14

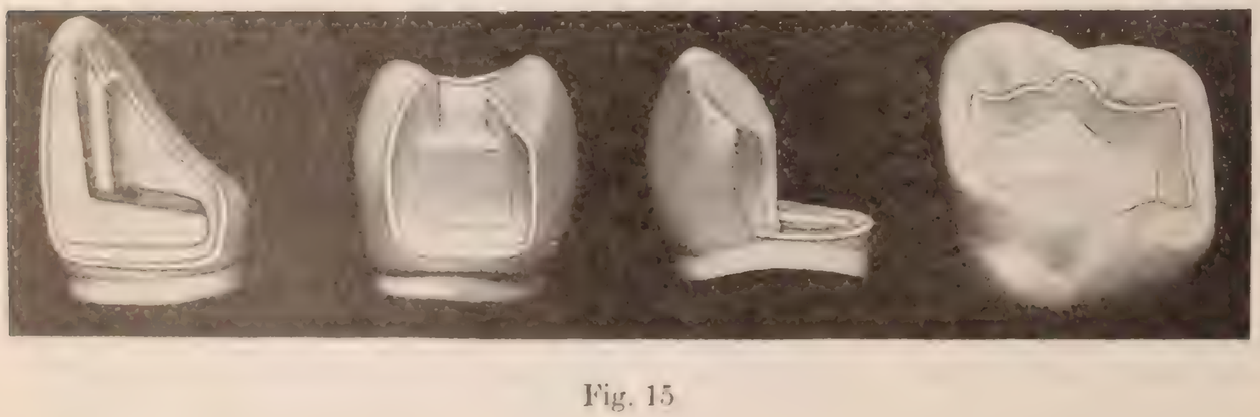

Fig. 15

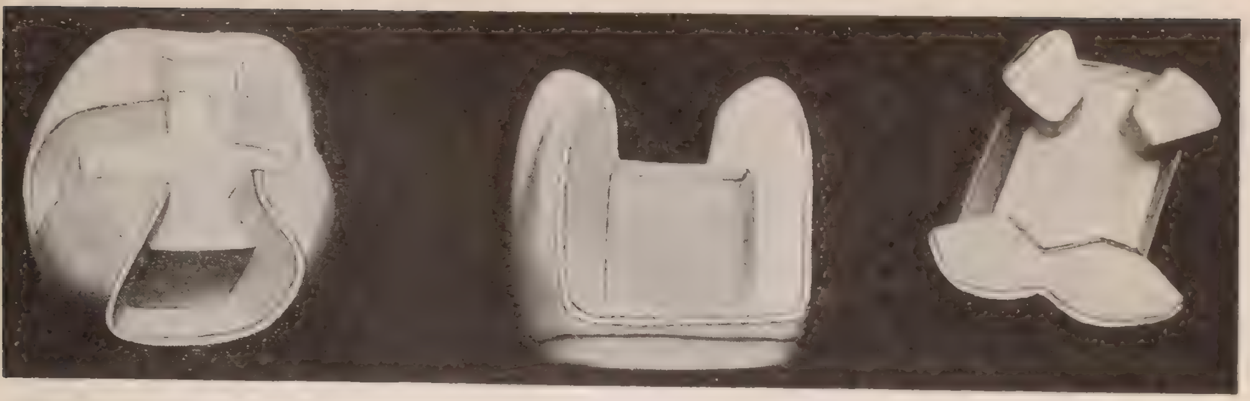

Fig. 16

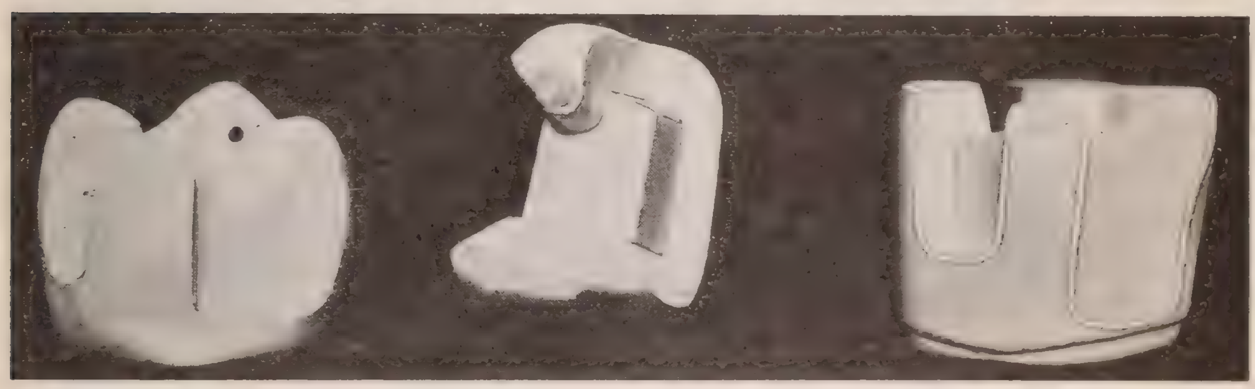

Fig. 17

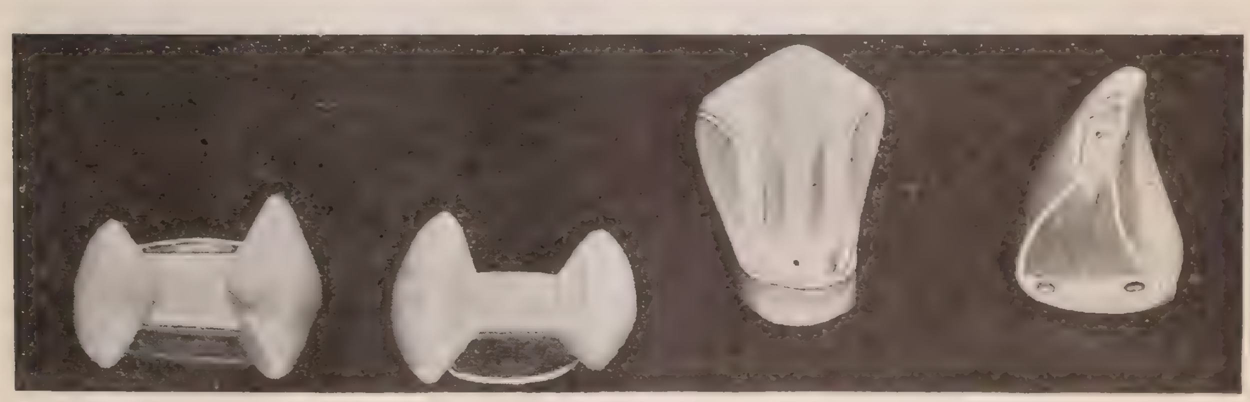

Fig. 18

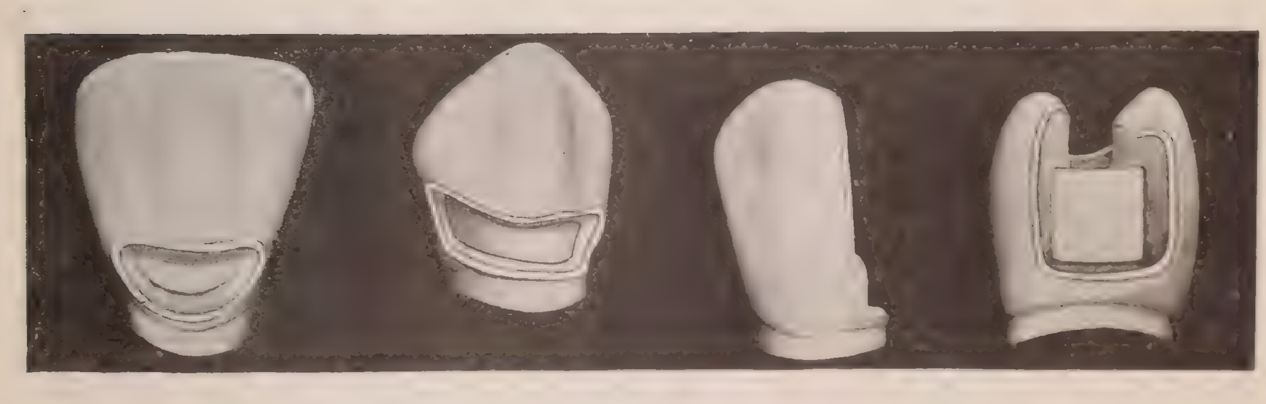

Fig. 19

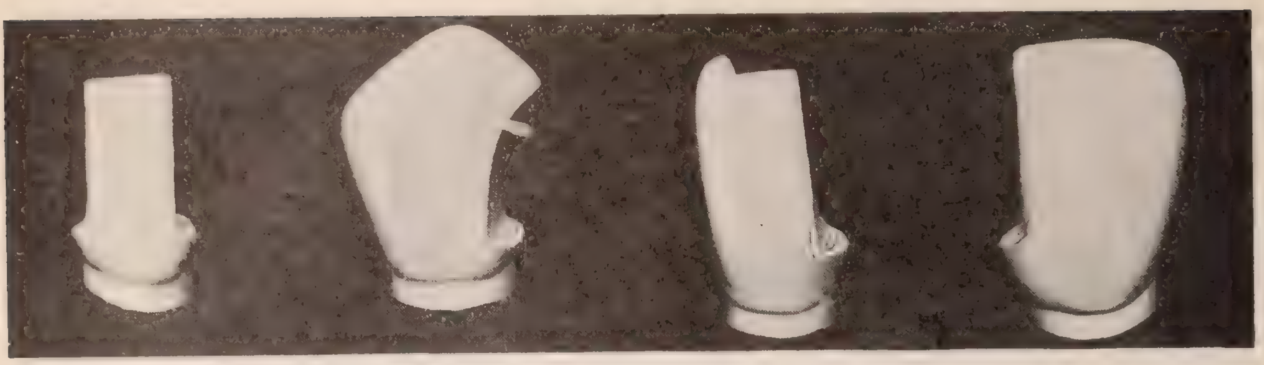

Fig. 20

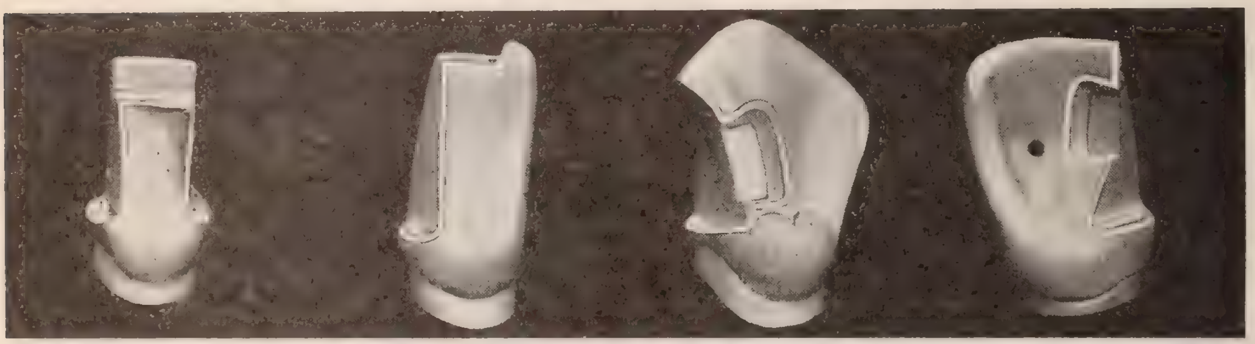

Fig. 21

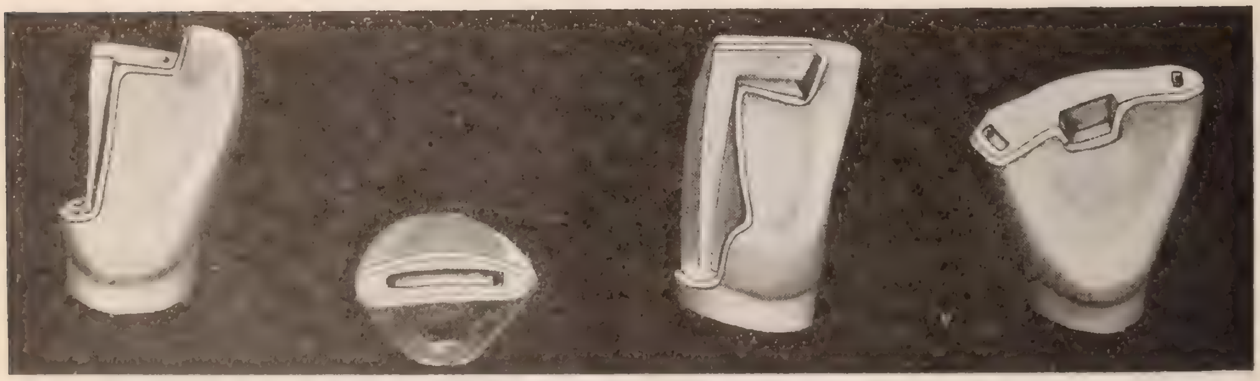

Fig. 22

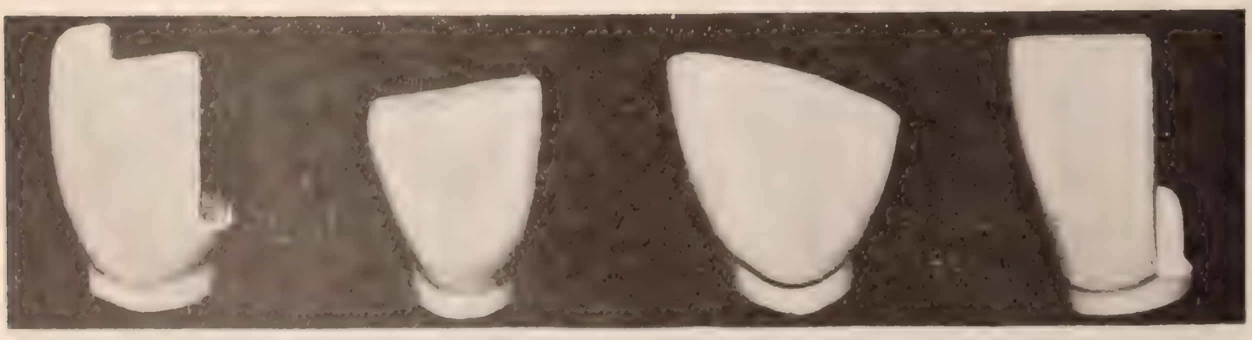

Fig. 23

TECHNIC OF FILLING ROOT CANALS*

BY DR. ALONZO MILTON NODINE, NEW YORK CITY

ORAL SURGEON AND DENTAL CONSULTANT FRENCH HOSPITAL OF NEW YORK: LATE ORAL AND DENTAL SURGEON HOSPITAL FRANCAIS DE NEW YORK PASSY PAR LUON (YONNE) FRANCE.

NO OPERATION which a dentist may perform is of greater importance to his patient's health or to his own reputation than root-canal filling. It deserves all the careful attention one may give it.

Ninety-five per cent. of the root canals in which the attempt has been made to fill them are not filled; seventy-five per cent. of these have areas of bone absorption revealable by the radiograph; eighty-nine per cent. of the chronic arthritic patients in Dr. Frank Billings' service in the Presbyterian Hospital in Chicago had chronic alveolar abscess!

Medical and dental journals frequently contain articles citing statistics of this kind. The finger of accusation is pointed with menacing and warning gesture at the dentist, and grave responsibility is being placed upon the dentist's shoulders. It is so grave and so certain that the number of dental malpractice suits in the North have materially increased. Such a condition I cannot conceive of arising in the South. This is a sign that some one is waking up besides the dentist. Now, what must we do to be saved?

First: We must not carelessly or thoughtlessly endanger the pulp of any tooth.

Second: We must not devitalize a pulp if any practical means may be employed to conserve it.

Third: When the necessity is thrust upon us to devitalize or remove the pulp of a tooth, we must do it carefully, thoroughly, aseptically.

Fourth: We ought to have a radiograph of the tooth to discover whether or not it is possible to fill the root should we attempt it.

How may we do this operation without making it the hazardous undertaking which it has so long secretly enjoyed? How must we remove vital pulps?

In removing pulps, in my hands, infiltration or conductive anesthesia with novocain has given me the most satisfactory results. For some peculiar personal bias, I don't use pressure anesthesia.

We will find it necessary, for reasons that will appeal alike to our common sense and scientific judgment, to put the rubber dam on the tooth from which we want to remove the pulp or the tooth whose roots we want to fill. Sometimes this is easy and sometimes it isn't. And for those times that it isn't, you may well employ to assist you one of those various suggestions found in text books and dental journals. When these all fail you will make an effort to remove the pulp or enlarge these canals without the rubber dam. For anyone saying it cannot be done without the rubber dam, I believe we will all agree that they do not know what they are talking about. Some teeth are so badly broken down that it is necessary to cement a band of some kind over the tooth and then place over this the dam. In every instance where possible use the dam to save time, to save trouble, and to insure as near as possible an aseptic operation.

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*Lecture before Golden Jubilee Meeting, Tennessee State Dental Society, June 1917.

Next open the pulp chamber; it ought to be so opened that you may see the entrance to all pulp canals. This may require the cutting away of one of the walls, but you should not hesitate to do this. You will lose so much time and patience, and your result will very likely be a failure that you may better sacrifice this tooth structure than be compelled to resort to it after spending a great deal of time trying to conserve it. For large canals we quite naturally use a little larger barbed broach to remove the pulp than we do for small ones. And for small canals the smallest barbed broach is not too small. These broaches may be sterilized by steam, hot water, alcohol, phenol, lysol or dipped in tricresol and formalin.

After we feel we have removed all the pulp, carefully work a fine XXX smooth, sterile broach to the apex. If we can reach the apex we may feel confident that we may enlarge the canal with sulphuric acid thirty per cent., or phenol-sulphonic acid, or sodium and potassium. If we find we have not removed all the pulp we may attempt to remove the remaining portion with what is called an apical curette. This is a very fine broach with but one or two barbs on the end of it.

After removing the pulp there is usually some hemorrhage. Wash out the contents of the pulp chamber and canal with sterile saline solution; then place in the pulp chamber a little dressing of alcohol or dry cotton and seal with cement or temporary stopping.

At the next appointment the canals are cleared of any coagulated blood and fine sterile wires inserted in the canal as far as possible and sealed with temporary stopping. Then a radiograph should be taken to find out if the wires have reached the apex. If they do not, the attempt should be made to enlarge the canals so the apex may be reached.

We will stop here a minute or two while we take up those teeth in which there are decomposed or septic root canals. These teeth should have their pulp chambers opened as freely as those from which we may have recently removed devitalized pulps. Frequently it is advisable to disinfect these decomposed pulps and canals before attempting to remove the pulp or enlarge the canal. For this purpose I use Buckley's tricresol and formalin solution, sealing it with either cement or temporary stopping for one or two treatments. Then I remove with barbed broaches the contents of the canals with as much care as possible. When the canals have been cleaned, using smooth broaches and sulphuric acid to help in the process, followed by a solution of bicarbonate of soda or sodium and potassium, what follows is the same technic for septic or non-septic cases. I carefully make an effort to work a fine smooth broach, called a path-finder, to the apex, using either sulphuric acid (thirty per cent.) or phenol-sulphonic acid, or sodium and potassium, to assist me. If I do not succeed with the smooth broach I then use a fine Young's broach or Kerr's broach, giving it half a turn and then withdrawing it, keeping this up until the apex is reached. Use either of the three previously-mentioned drugs to assist in softening the periphery of the canal. Root-canal picks also are used to good advantage; sometimes I use one, sometimes I use all three drugs just mentioned. Sodium dioxid is also a good material to bleach the pulp cavity and sterilize the canals. Neutralize the sulphuric acid and phenol-sulphonic acid with bicarbonate of soda and neutralize the sodium and potassium with sulphuric acid. In very obstinate cases I don't hesitate to place some sodium and potassium in the canals and seal it over night with gutta percha. This soon loses its effect and no serious results are liable to follow.

When the apex of the root has at last been reached, diagnostic wires are again sealed in the canal to confirm your belief. We may then proceed to enlarge the canals with Kerr root-canal files or Kerr's broaches, or very fine barbed broaches, or Young's broaches, or Best's root-canal files. After removing all debris from the canal, if there is any suspicion of there being an apical infection either from clinical symptoms or radiographic evidence, we may adopt either one of two courses: First, we may ionize the infected area, or, second, we may attempt to disinfect or cauterize it with phenol-sulphonic acid or some other similar agent. We are now ready to fill the canals.

For drying out the canals I use acetone followed by a hot-air spray or a root-canal dryer. I then put in the canal Callahan's rosin and chloroform solution, working it to the apex with a fine smooth broach. While this is still fluid, I pump up into the canal chloro-percha. Then I push into the canal small sterile gutta-percha points, about three-sixteenths of an inch long and about the size of a good sized broach. I keep packing these in the canal until the patient feels the chloro-percha going through the apex.

The reason I push the chloro-percha through is to be sure the canal is filled to the end and not for the hypothical purpose of so tightly encapsulating the end of the root with surplus gutta percha that no infection may penetrate the numerous foramina that are so frequently found there.

When the canal is tightly packed with gutta-percha points and the chloroform has all been evaporated, we may seal the entrance of these canals with oxy-chlorid of zinc. Then we may place in the pulp chamber any cement filling material we want. A radiograph is now taken to find out if our filling material has filled the root. After pushing the chloro-percha through the apex, the tooth may be sore for a day, maybe a week, but if all aseptic precautions have been taken and all instruments and material have been sterilized, you need have no apprehension as to this soreness passing away. If root canals are so crooked and twisted or are so fine that they are unfillable, then fill them as far as possible, take a radiograph and resect the root down to the point where the filling material ends. This operation of resecting the ends of roots is one that has given me such fine results that I feel confident that with a careful and aseptic technic this will become one of the most common operations that either the oral surgeon or general practitioner will be called upon to do.

In closing, may I remind you that the one factor necessary for the filling of root canals is patience? Without it, all others are of no avail. Could I think of a formula for the successful filling of root canals it would be three-fifths patience, one-fifth experience and one-fifth skill.

PROPHYLAXIS*

BY A. A. ARNOLD, D.D.S., GALVESTON, TEXAS

THE DENTAL PROFESSION has to fight and will have to continue to fight for clean teeth, because we are becoming more and more convinced that a very large amount of pathogenic bacilli have their most favorable portal of entry through the teeth. It has been proven that nearly all the scourges of mankind have their portals of entry into the system through the teeth, and the medical profession of today is more interested in determining the prevention and cause of disease than in the cure of disease. The looking for the cause and prevention of disease is noticeable in all magazines, and is one of the splendid signs of the times. In the past more thought and time were devoted to repair- and patch-work after the damage had been done; today we are doing preventive medicine and preventive dentistry, which is the real meaning of the subject of this paper.

Prophylaxis means to guard against and to prevent, whether applied to the prophylactic treatment of a recently erupted molar with deep fissures and pits, which would surely mean serious trouble for the patient in a very short time, or whether applied to a case of malformation about to be treated by the orthodontist, or to the patient presenting where the enamel of the teeth is rough and requires smoothing and polishing to prevent fermentive masses collecting around the necks of the teeth, which is always the forerunner of pyorrhea and without which the amœba have nothing to live and thrive upon. These soft cheesy accumulations around the gingiva are the real drawing cards for the little bugs, and you will not find them in a mouth which is free from such debris and filth, for they have nothing to feed upon in a clean mouth and, consequently, they soon move out.

Without any doubt whatever, the dentistry of the future will be preventive dentistry, as practiced today by the competent oral prophylaxis specialist. The time soon will come when the thinking and painstaking men of the profession will realize that a properly-conducted dental practice cannot be maintained without the aid of a prophylaxis specialist in connection with the establishment. A great many of us will have to do a little educational work along these lines to enable our patients to fully appreciate just what the benefits will be from such treatments when properly carried out at stated intervals. No person of average intelligence will fail to grasp the full importance of any course of treatment that has for its object a clean mouth and the prevention of disease of the teeth and gums. We may have to spend a little time explaining, etc., but, gentlemen, the time is surely coming and the results will certainly be worth while.

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*Read before the Texas State Dental Society, 1917.

The medical men today are telling us that if we can eliminate focal infections and systemic disturbances resulting from periapical disturbances, that they can eliminate a great many diseases and thereby lengthen human life, and if any definite progress is to be made in this field of endeavor, we must find some way to eliminate the cause of such infections, which I believe at present is generally thought to be due to imperfectly-filled root canals in the great majority of cases; and, gentlemen, my candid opinion on the subject of root-canal filling is that the dental profession today does not know, to use a common expression, just where it is *at*, and if success depends on thoroughly filling all root canals to the apex, it is my belief that we had better begin preaching and practicing prophylaxis early and avoid the necessity of removing the pulps of the teeth. I am one of the men who do not believe that the time has or will ever come when we can successfully fill all roots of multi-rooted teeth to the apices, unless we use acids, etc., to enlarge them very much, and they tell us we get our first destruction of periapical tissue when we use acids in the root canals. As soon as some fellow finds a way to get into the canals, another chap bobs up and proves by experiment, etc., that we are doing more mischief than we would have done had we not attempted to fill the canals so perfectly. So I say again, preach prophylaxis, which means clean teeth, little or no decay, and consequently fewer if any devitalized of pulpless teeth.

Again referring to periapical infections, some radical men even go so far as to recommend the extraction of all pulpless teeth. Greaves, in an excellent paper published in *Dental Cosmos*, October, 1915, speaks of three dangers of operating in the apical space:

First: The production of a minute periapical tissue necrosis of which the operator is not aware.

Second: Infection at that area which has lost its resistance by this process.

Third: If he succeeds in closing it without infection, the final arrival, by hematogenous convoy, of micro-organisms which may lodge there.

The presence of multi-apical foramina which are supposed to run as high as twenty-five per cent., and the impossibility of properly filling them, is also to be considered.

We have also found out that the radiographs have many faults and when it comes to testing apical conditions they cannot be relied upon. The absence of pain does not necessarily indicate that the part is not dangerously infected. Hartzell, after many exhaustive tests, was able to demonstrate the same organism first located at a root apex, later as the cause of a disorder at some distant part. In the face of all this, what is more logical than to preach and practice prophylaxis, whose aim is to prevent rather than to attempt to treat and cure such serious conditions. When we consider that the vast majority of teeth that are lost are due to a disease having its origin at the gingival margin, is it not astonishing that so little attention has been given to this condition by the bulk of the profession? Nutrition is seriously interfered with by loose and sore teeth and toxines are absorbed during its progress. The health of the patient is affected beyond question. This most serious of dental diseases is easily prevented and held in check by proper prophylactic treatments when taken in its incipiency.

The unsatisfactory results obtained in the treatment of a well-established case of pyorrhea is so well known to the profession that it is hardly necessary to mention same. When we say clean teeth will not decay, we, of course, know that we do not state an absolute truth. Of course, if it were possible to produce surgically clean teeth instead of mechanically clean teeth, thereby freeing them from all micro-organisms, and their enzymes, our results would be different. Unfortunately we are able to clean teeth only mechanically, and in a few hours after our treatment the revealing fluids will again show the presence of the plaques; yet in spite of these facts, we must practice prophylaxis and hope to get results through the protective action of the gingivæ and mucosa and by giving them a healthy environment.

There is no better bacteriolytic agent than the healthy mucous membrane of the mouth. It has been proven that contagious diseases in children could be reduced ninety per cent. by keeping the mouth in a healthy condition, and if this is true in children, the same will prove good in adults. These are scientific facts, not guesswork, so how can we fail to preach and practice prophylaxis? In giving properly-carried-out, prophylactic treatments we must be careful not to injure the gingivæ; remove thoroughly with great care all deposits which will irritate this organ, being careful to polish with orange-wood sticks, and finally powdered pumice stone, the roots of the teeth by hand instead of using revolving instruments. Avoid use of strips or anything which will tear the gums; in other words, use the treatment more to remove deposits and to leave a smooth surface rather than to highly polish the enamel or root surface.

I believe in the smile, but I claim that there must be something back of the smile. The smile that is enkindled by the right sort of brain stuff and soul stuff, and I might add body stuff, and which beams from the eye and lights up the face of the true man, is indeed an asset of much value in the factory, on the road, behind the counter and in all walks of life. But without this fuel, I never knew a smile to be warm or cheering.—*Henry Ford.*

SANITARY FIXED BRIDGES*

BY J. T. EDWARDS, D.D.S., FORT WORTH, TEXAS

CROWN-AND-BRIDGE WORK has received the condemnation of many of our professional brethren, a stigma that we must confront, however boastful of our achievements in this work during the past. Eminent pathologists during recent years have been loud in their indictment and charge us with inserting mechanical devices as artificial substitutes which become a serious menace to the health of patients.

Errors in judgment of selecting our cases and errors in the character of work selected, together with a disregard for the pathological conditions present, have given rise to very serious and even fatal lesions which develop under crown and bridge work.

There are three cardinal principles which we must enforce in the construction of a bridge. It must be *aseptic, durable* and *efficient.* These are principles which we must regard and are indispensable if the work is to be a success.

The bridge should be constructed in such a manner as to make all portions accessible to the tooth brush in cleaning, and that it may be kept as free as possible from the accumulation of food stuff and other debris.

All surfaces adjacent to the abutment crowns should be made convex instead of concave or even flat or plane. All surfaces above each individual "dummy" should, as far as possible, be made convex and accessible to the brush or cloth tape, which can be passed through the interproximal spaces and friction applied to all parts of the bridge.

In building the dummies down in this manner, we duplicate as nearly as possible the shape of the natural teeth, and by rounding them off we leave them so that they can be polished by means of polishing devices, such as tape or brushes.

Crowning or attempting to crown a vital tooth successfully is next to impossible. Irritation caused from denuding the tooth of its enamel and from forcing the acid from the cement through the dental tubules by the great pressure which is necessary in setting a crown or bridge, in many cases, causes secondary dentin deposits, dento-alveolar abscesses and many other kindred troubles. There are a few exceptions to this rule.

The tooth to be crowned is ground down to a stump shape, with its walls a little less than parallel. A ferrule is fitted to this; a wax impression is made and the contour and cusps are all restored in one casting. Their contours should be restored to duplicate the form of the remaining natural teeth in each individual case. These crowns can be carved in the mouth, but preferably should be made from plaster models. How many cases have we seen where the crowns were made lacking proper contour, and as a result the surrounding soft tissue is pushed away and the sides of the roots are worn away by abrasion from masticating.

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*Read before the Texas State Dental Society, 1917.

Crowns made in this manner are superior in many ways to the ordinary swaged crown, viz., anatomical form, durability, stability and strength. In the old-style swaged crown there is always an error introduced in the process of making. When we guess at the thickness the cusp should be, or the amount of solder used to just fill the cusp, and let the crown seat itself properly on the stump without more grinding, we guess at the amount of solder and sometimes use too much and very often not enough. With the crown in position and contact points properly restored, we should have full plaster impressions, both upper and lower, and models mounted on anatomical articulator.

In this way we can view the work from all angles, and the occlusion on the opposite side is a great aid to restoring normal occlusion to the bridge. It is next to impossible to restore normal occlusion to a bridge unless we have full models, for we can place the opposing teeth in contact on a straight line, open and close articulator, and we simply have articulation. But to get occlusion, we must have the occlusal surfaces of the teeth coming together in a grinding manner with the various movements of mastication, and on both sides of the jaw at once. If the force of mastication is exerted on one or two teeth and the pressure of stress of mastication is unequal, the result will be disastrous. The bridge will be pulled to pieces, or this concentration of stress on one point will set up an irritation to the supporting stump and result in failure for the bridge. With normal occlusion, it is impossible to exert undue pressure on any one tooth.

This method of constructing bridges is, of course, more practicable for the lowers than for uppers. It differs from the ordinary so-called sanitary bridges in the lower, for in place of the so-called double inside and outside solid cleansing space, each individual dummy is built down inside and outside to approximate the natural form of the tooth, and are rounded off on the ends with spaces between to represent the natural interproximate spaces. In this way the whole space between the supporting abutments is built out to conform to the natural shape of the teeth in a normal jaw.

This prohibits the lodgment of particles of food between the cheek and the bridge and is more comfortable to the tongue.

The demand for aseptic crown and bridge work has become so great that we must make our fixed bridges more sanitary, or we must make them removable. While we have made great strides in this work, nevertheless we are confronted with such accusations that make us think we have not been diligent in the application of knowledge which we have had at our hands.

PRESIDENT'S ADDRESS*

BY D. M. CATTELL, D.D.S., M.A., MEMPHIS, TENN.

"THE STARS AND STRIPES upon the Western front; America, France, Britain, Belgium, Italy and Russia united in a common cause, the so-called Divine Right of Kings perishing before the guns of Democracy—this is the supreme hour of the world's history.

We, the children of exile, have returned to conquer where our fathers battled tyranny and bore the cross.

Sons of the wronged, of the Huguenot martyr, the persecuted Pilgrim, the proscribed Jacobite, the downtrodden Pole, the tortured Slav and the oppressed Jew—our memories inherit their scars and our hearts are scored with their ancient wounds.

We come, Autocracy, to render judgment!

That our kinsmen shall ever walk free, that our children may live in peace, that the *crown* may not obscure the light of *progress*, that the knout shall be broken and bigotry slain, that *reason* shall rule where *force* has swayed, we, the people of these United States, have risen in arms to uphold the right, to defend the faith, to glorify the sacrifice of our sires.

In the name of Justice, Humanity and Civilization, for God's sake and for universal freedom, we draw the sacred sword of progressive Ambition!"

So, also, is the sword of history drawn in the interests of the divine professions—Theology, Law, Medicine and Dentistry are arrayed in a common cause against *ignorance* and lack of comprehension of natural organic laws.

We, the dental profession, for a long time exiles from our natural parent home, have so lived, developed, prospered, that she who pushed us without her doors has lovingly waved the hand of welcome toward our return, and we, having grown tired of our wandering alone, are full of joy and delightful anticipation of the reunion. We realize that the greater problems, *hygiene*, *health* and *happiness*, cannot be worked out alone by the partial means at our command. Hence, from this time on our beloved Mater, having given the welcome earnestly and with heartfelt honesty, we, on our part, accept with gratitude the proffered welcome and anticipate a return to work in the common home of medicine and surgery, that our labors will be appreciated and recognized.

Mæterlinck says: One bee can never make honey, for the reason that a bee, separated from other bees, has no intelligence. Bees succeed only by working for the good of other bees. A single bee separated from the hive is absolutely helpless; yet a hive of bees has a very great and well-defined purpose and intelligence, and this intelligence Mæterlinck calls the "Spirit of the Hive."

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*Delivered at Golden Jubilee Session Tennessee State Dental Association, Memphis June, 1917.

"But occasionally a bee will go off to the fields and come back gorged with honey, bringing nothing for the common stock. And this bee is quickly killed—stung to death by a self-appointed board which sits on the case and considers that any bee that loses sight of the 'spirit of the hive' and works only for a private good is sick, criminally insane, and cannot be allowed longer to take up good space.

"Men are under the domain of natural law as much as bees. Men succeed only by working with other men and for other men. No man can stand alone in life, or work alone in a business or profession, and at the same time obtain for himself the same rewards and money, influence or happiness as when he works with and by and through the organization and the social body of which he is a part."

And so, ladies and gentlemen, we are here in the general cause, fighting as one regiment of the greater army against our common enemy—*Dirt, Disease, Death.*

With our ear to the ground we hear the rumbling sound as of thunder—the moving thought-masses of progress and enlightenment. Having raised from a listening position with our mind attuned to the receptive attitude it is easy to read the writing on the wall—so clearly was it written that they who run might read.

The multiple result of the wall-readings by the various committees appointed at our last meeting in Knoxville has culminated in this interesting and interested audience, keyed up to the mental capacity of receiving and absorbing the pabulum placed before you through the medium of these men of talent whom the program committee has brought together. Never did a committee do such mental acrobatic stunts to bring so great an array of "high-brows" together as these gentlemen answering the roll call under the title of "Program Committee."

At one time we thought it advisable to hold the entertainment of this our "Golden Jubilee" session more in keeping with the social side of life, but that blazing indication on the wall instructed us to listen to the "signs of the times," hence this array of research workers present for your edification and instruction.

Your physical comfort and entertainment is being looked after by a most competent local committee, where every wish was and is that you should fare well and sumptuously—that you should feel at home and enjoy yourselves thoroughly.

Now, ladies and gentlemen, this being our fiftieth mile-stone in the planting, it should be also the turning over of a new leaf, a new order of procedure in many ways. The spirit of the times says—*New ways, better efficiency, greater results.* I shall only hint at one greatly needed change: The history committee had great difficulty in obtaining the data necessary for their report. Minutes have been poorly kept—often so badly written up as to be almost illegible. There are six separate books of records covering the past fifty years, yet only five are in the possession of the secretary. The minute book covering the period from 1894 to 1901 inclusive, is missing.

I suggest that the secretary be authorized to purchase a large, loose-leaf record book; that the history of the past fifty years as developed by the history committee, be typewritten on the first pages of the book, and that thereafter each succeeding secretary have the minutes, as made up by him and approved by the society, typewritten therein, and that a japanned tin box or other suitable receptacle be purchased of a size to hold all the records up to the present one (including a copy of the fiftieth session) and said box be stored in some safe place, designated by the association direct or by committee.

A word more and we'll let the highbrows, the men of talent, tell the rest. This has been the busiest year in all Dentaldom. Any time taken from legitimate practice has seemed a sacrifice. On that and other accounts our committee on revision of by-laws has been unable to make final report. However, it is necessary that the work of revision go on to completion. Many of our existing rules are made obsolete by present procedure. When our association became a component part of the National, certain rules were set aside to accommodate that procedure; also, when local societies made themselves components of our state association, older rules became non-effective. Then again, the annual dues are different than formerly. Indeed, many progressive ideas have been suggested, the need is great for revision and additions to the printed booklet of 1911. So again I suggest that the committee appointed last year on revision be continued and such changes be made in accordance with the exigencies of the times. And now with a word for you to carry away, stored in some convenient brain cell to be called forth when needed: I would say, to make a good living, to have a happy family, to make preparation for hard times, to wear overalls in the shop or field with the same dignity as good clothes are worn on Sunday, to be confident you are laying a sure foundation for any future success, to feel that you are master of your work, and that you share the creative spirit.

This is the Philosophy of Life.

A WORTHY BOOK,

Standardizing the Amalgam Filling. By Walter G. Crandall, D.D.S. Second edition. Cleveland; The Cleveland Dental Mfg. Co., Pubs.

This book of fifty-nine pages contains much information that every dentist should have. The subject matter is written under the following heads: Proper Cavity Preparation; Accurately Tested Alloys of the Greatest Strength and Stability; Correct Amalgamation; Correct Instrumentation and Condensation; Correct Contour and Finish of the Restoration; Profitable Fees

If you want a copy of the book write to the publishers regarding it.

THE INTERNIST AND HIS RELATION TO THE DENTIST*

BY CHARLES P. EMERSON, M.D., INDIANAPOLIS, IND.

DEAN OF THE INDIANA MEDICAL COLLEGE

I KNOW of no branch of American professional science where America stands more prominently in the foreground than in dentistry. American physicians have been good, but neither in their original work nor in their practice have they been able to compete with those of certain foreign countries, simply because our internists have not been ready to spend the necessary time in preparing themselves for their profession. American surgeons have reached very high prominence in the practice of surgery, but the American surgeon has not made his profession; he has, until recently, in large measure borrowed it from abroad. The American dentist has not alone been the pioneer, but also the best practitioner in his science. I did not realize it until I lived abroad, until I saw "American Dentist" on the doors of men who were the best in that profession, and saw the respect in which American dentists were held abroad. I was not surprised to see that even the kaiser depends on his American dentist to help him out of his tooth difficulties. I did not recognize it until I talked with the citizens with whom I lived in Germany, and my friends, and found the American dentist was considered the best dentist there. I do hope, however, that the success the American dentist has had will not now be an impediment to him in swinging around as he must with the wind of medical advance; in following a new trend; in taking, if I may use the expression, a new tack; in making a "right-about face" in certain directions.

The man who is successful is apt to stick to the line in which he has made his success. He has been successful in his field, and he feels that is good enough. He is not nearly as likely to be pliable, as able to adapt himself to new conditions as the man who has not been so successful.

The question which now presents itself in view of new advances in medicine which have a dental bearing, is: Will the dental profession be willing to veer around to a new point or view, or will the American dental profession try to forge ahead in that line in which it has been so pre-eminently successful? We have seen internal medicine swing to a new course several times in the last twenty years. The doctor of today is not the doctor of twenty years ago; the profession he practices is not that of twenty years ago. We have had to right-about-face on several points. For instance, the functional neuroses, the question of hysteria, the question concerning the relationship between medicine and surgery, the problems that arise concerning general infections, those greater problems that have arisen because of the development of preventive medicine, and those problems which are the results of social service or practical medicine for the poor. We doctors may have been the artisan with the clay in hand which he tries to mold, but try as he will, there is some force over which he has no control molding it in his hands, giving him a new science from year to year, forcing him to change his methods of practice. We have very little control over our profession, because it was not we who made the advances which change it; it is the man in the laboratory, the man in experimental work. We would have preferred to have kept in a straight course, but those advances in experimental medicine made us advance, and it is these same advances which demand now that the dentist change in no small measure. For that field, the mouth, where you reign, is a field where you had eminent domain a few years ago, but now it is our field, too, for it is one of the most important parts of the body as regards infection and some of the reflex neuroses.

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*A lecture delivered before the Indiana State Dental Society, Indianapolis, 1917.

These advances in clinical medicine are not recent advances. There are some who would have you believe that the idea of focal infection is something new It is true we have been aroused to it by Roseneau's splendid work in the laboratory. He has proven some things that formerly were matters of opinion. But the campaign against the tonsil, and the slaying of innocent tonsils began in 1896, and in Europe before that. In 1908 the campaign against diseased teeth was in full swing. When in 1908 I took charge of an institution in New York City, the campaign following the teachings of a few years ago was against the teeth, removing whole sets of teeth from individuals who had bad infections. Of course then, in 1908, we did not have these fine X-ray plates and could not distinguish between the teeth, and so removed them all.

Before I speak further of those focal infections in the mouth, I want to make the general statement that advances in medicine, especially in America, I am sorry to say, are apt to be by fits and starts—one excess follows another. It has been four feet up the hill and two down. We are faddists. We cannot deny it. We will catch an idea, and with the aid of various journals and agents of pharmaceutical manufacturers, we put it in full force in a few minutes. For a while it is the gospel, and then two or three years later we must back water. One such fad was stock and autogenous vaccines. I do not know whether many of you were at the German House, two or three years ago, when you invited me to speak, and you were talking about autogenous vaccines. At the risk of being put out of the door, we dared to condemn it, and you took it very kindly. But remember, now the last word is that *there is nothing in it.* We have not made even two steps up.

You who were at the German House will remember what an enthusiastic spirit there was in the air, how interested people were in autogenous vaccines, how many laboratories were beginning research work in it, how many dentists were prepared to give this treatment—and I fear now there is *absolutely nothing* in it. Do you hear now about the endamœba buccalis? I haven't heard it named for a while. How much do you know now about emetin? How many are using alcrestra tablets?. This is unfortunate, because although a man has a right to change his mind, and inconsistency is the bugbear of only the small mind, yet our patients expect us to have pretty sure ground before we put our ideas into practice on them. Our surgeons very seldom suspend a kidney now, although it was common enough when I was a medical student. We very seldom now operate for a pain in the back, realizing that probably the spine is to blame and not the internal organs. The gynecologist does not walk into his local society every meeting night with a little tin pail of ovaries he has removed during the last week.

I have used illustrations from my profession to show that Americans have been too prone to follow fads and to warn that our patients, while they may expect us to try to prove all things and hold fast to what is good, do not expect us to practice all the time on them to find out whether a certain treatment is good or not. They expect us to work in a very tentative and conservative way; and we are not doing it.

I say very frankly that I believe we must discount a large percentage of this doctrine of the focal infection, not so far as its importance is concerned as much as insofar as our ability to handle it is concerned. If the house gets on fire it is well to put out the fire, but that does not rebuild the house. The damage from focal infections is one thing, to expect that damage to be automatically repaired as soon as the focal infection is removed is another thing. To put out a fire in the woodshed, from which the barn has caught fire, is one thing, but to expect the barn to stop burning when the fire in the woodshed is put out is another thing. If the teeth "get on fire" and set fire to the organs of the body, to take care of the teeth does not at once repair the damage done in the other organs. We do not know yet whether the infections at the roots of the teeth are primary or secondary. We do not know yet how important the spread of infection from the roots of teeth is. We believe we have exaggerated the importance of infected tonsils. That word of warning is being sounded. The best papers now on tonsilectomy implore us to go slowly. We do not give as much credence to that operation as we did some years ago. Are we doing it in the case of the teeth? I do not know; perhaps so, for the history of medicine is that we have to retract always from an enthusiastic position.

There are a few men who have clinics completely under their control in wards. There are a few men whose training is such that they can be accurate in their work, know how to check it up, and these men, with relatively few observations, can find out what there is in any new method a great deal quicker than can the general profession, who must use it in a rather haphazard and uncontrolled way. You say, "Yet we get good results." We do from almost anything we try, if we are allowed to try it. Why is it that the operations tried on neurasthenic women a few years ago were so successful? In some cases the trend of thought was changed. Take a woman who is worrying about herself, and has very much the same sensations day after day and month after month. She gets into a mental rut.

One thing you must do for her is to jog her out of the rut. To think about a surgical operation, and to speculate upon the effect of an anesthetic and to hypothecate the surgeon's bill are problems which will break up any chain of thought. You dentists can do that, too, because I challenge anybody to hold fast to a chain of thought when a dentist is digging down into a root of a tooth with those little needles, with teeth on the edge.

These operations of a few years ago—I am speaking now of surgeons and not of dentists—broke up the chain of thought. Christian scientists do that very well and get good results. If you break the chain of thought you have taken the first step toward getting well. Second, the simplest operations keep the patients three weeks in bed. They hadn't been three weeks in bed for quite a while. Third, it kept them on a careful diet for three weeks; more careful than ever before. Then there is particular care for the bowels, etc. Therefore in most of those operations, the suspension of the kidneys, of the uterus, the kinking of the mesentery, the short circuiting of the colon (which now we are doing our best to un-short circuit), those operations did well according to first results. The patient left the hospital, signing the check for the operation with thanksgiving for the splendid result. All right. Wait six months; let the person go back into the old environment. Let the effect of the suggestion of the operation, and let that break in the chain of thought restore itself, and the old thoughts all come back. Leave her in the old environment, with the previous mental habits, and all old responsibilities, and what do we see? I saw one woman who had had nine major operations on her abdomen, and all she needed in the first place was a *little encouragement and a pair of glasses.* I know of another woman—she was not my patient—who had had eleven major operations on her abdomen, and she *never should have had the first one.* But you know how it is. The first operation removes the appendix, and then the old pain will come back, and then we suspend the kidney. Then the old pains come back, and then we shorten the mesentery, and the old pains come back; and then there are the adhesions from the first operation. That is remedied—the old pains come back and then there are the adhesions from the second operation. *The old pains come back,* and pretty soon you have a thoroughly hospitalized patient, coming back and begging for the tenth operation, as that woman did—and *the pains came back!*

I am speaking *entre nous.* We are members of the same profession. That is the illustration of the folly of following a fad too far.

Now as regards focal infections: We believe we have carried the doctrine of tonsilectomy much too far, and it is possible that we are exaggerating the importance of infected roots of teeth. I do not know whether we are or not. I think we should go slowly until we have seen some of the results, until we have followed them far enough to know whether the results are worth while. You can prove that work from ten as well as two thousand, and if your results are not satisfactory with ten cases, *spare the rest of them.* It is possible we can prevent these infections, and it may be that *prevention* will be far superior to treatment; I do not know. I say, however, it takes a well-trained man to say whether or not it is so.

That leads me up really to the point of my argument, which is this: Mouth surgery is surgery, in no way different from the surgery of the abdomen. You have the same laws of pathology, the same laws of bacteriology, the same laws of plastic surgery. Now it may be--I do not know—I hope, that the dental profession will see how much of medicine there is in dentistry, and I hope that the dental boys of the future will get at least the first two years of medicine before they begin operative dentistry. The bacteriology is the same, the pathology is the same, the operative measures are the same, the care in post-operative treatment is the same. I look forward to the time when men who work on the mouth will have to have the whole M.D. degree before they can begin their work on the mouth. At least, allow them to have special training as some of you have. Go back to the medical schools, take a course, and remember the words of Ralph Waldo Emerson concerning Plato: "He does his work best who steps down from a higher level." And for the man who *could* remove a sarcoma from the antrum it is fun to take out an unerupted tooth; and the man who *could* relieve an abdomen from pus does not find it difficult to amputate the root of a tooth. The surgeons of the past have not taken up mouth surgery because they thought it beneath them, perhaps, but the surgeons of the future will take up mouth surgery. Why? Because they believe it important for the health of their patients. We do not allow a man now to prescribe for the eye unless he is an M.D., plus a training in ophthalmology. The time will come (it has not been necessary in the past, and American dentistry has forged ahead to a preeminent position) when you may have to change your course as we have. and decide that only he who is first of all well trained in pathology, bacteriology, minor surgery at least (although the surgery of the mouth is not minor surgery by any means) can specialize in the surgery of the mouth.

There are other fads. I know I am going to arouse a little opposition when I say some of our dentists have over-emphasized the importance of the tooth brush—the stiff-bristled brush. You say, "It must be used correctly." One of you once tried to tell me how, and he said, "I am not sure I always do it correctly." If he didn't, how should I know how to properly use it? I don't. I am not at all sure that tooth brushes will reform the next generation. I am not sure that the scrubbing which the child gives his teeth won't injure the pericemental membrane of the mouth, and I am not sure they are not going to do more harm than good.

I heard the story the other day of one of your dental examinations in our schools, of two children with perfect teeth who had never seen a tooth brush. The dental inspector expressed his horror, and recommended they get a tooth brush at once. And yet I am assured that these children had the two best sets of teeth in the school. Is it not possible that the fault is with our diet? Shouldn't we give a course of feeding to our children? Isn't it possible we should take better care of the first set of teeth? I am talking about your profession now, and I am like a fool stepping in where you angels may fear to tread; but isn't it possible?

I am now going to speak about a medical fad, and you have no right to criticise me there, because that is my profession. You know that Americans are fools sometimes. We are paying $16.00 a barrel for flour, I am told; and I am told we are going to pay $20.00. What is this flour? It is finely milled wheat, with all the bran of the wheat removed, and we pay a high price for this very nice white flour, and then we go and pay another high price for another man to put that bran back into breakfast food. Why not buy whole-wheat flour at first? We are paying a big price to get the branless flour, and paying a big price to get branful breakfast food, and somebody makes a lot of money out of us. If the children would chew a coarser bread, a coarser diet, we would have less caries later on. If hygiene of the mouth were better taught, not with a hard-bristled brush—there are other means—there would be less alveolar trouble, less pyorrhea, less gingivitis, because there would be less inflammation in the mouth. Isn't that possible?

I am sure if our children were better cared for, so far as the hygiene of the throat is concerned, we would have less tonsilitis, and if there were better care of the tonsils we would have less mouth infection, and I think if we had less mouth infection there would be less pyorrhea and less root abscess formations. I believe if we took better care of our light colds we would have less nasal infections. If there were less nasal infection, there would be less mouth infection, because these organs are close to each other. If there were less mouth infection there would be less tooth infection. It has not been proven. I say it has not been proven, and therefore we practitioners of medicine and dentistry must be careful not to carry our fads too far.

It is possible, and I believe it is true, that we have carried our tonsil treatment too far. Yet I doubt that we have carried our tooth surgery far enough. We have only made a beginning. The results are very promising, but I will say this: *I have yet to see a patient improved from the tooth treatment alone.* Usually treatment of the tonsils and nose must be combined with it. I have seen patients that have improved splendidly who have had good nose and throat and tooth treatment; and often we should. And yet, in dealing with teeth, we must care for the nasal sinuses also.

I do not know whether amputating roots of teeth removes infection. I do not believe we should sacrifice more teeth than we have to; yet I am now more afraid of a bad root than of a tonsil. I do not believe we have yet carried our tooth surgery to the degree we should. I believe we have not yet realized its great importance. I am afraid of those infected roots and wish to say this seriously, although I may often offend somebody. I remember teeth were first crowned when I was a boy about ten years old. I remember of the dentist who brought suit against the dental profession for all the crowning, claiming they must pay him a royalty on every crown, and he said very naively that he expected his income would amount to several million dollars a year. I am told he is not collecting it. But remember that the crowning of teeth is a question of the last thirty years. Remember that while preventive medicine, by decreasing the diseases of children and adolescence, has increased the duration of the average American life twelve and a fraction years, so that the average infant born has an expectancy of life of twelve and a fraction years more than one of thirty years ago; remember that for the man who reaches forty years of age his expectancy is three years less than it was thirty years ago, and I believe that infected mouths explain no small fraction of that reduced expectancy of life. A rather extreme statement, you say. Very well. Take the figures of the combined Board of Actuaries of our American life insurance companies. Note that the expectancy of life of the individual in the last thirty years has increased twelve years, and note that the expectancy of life for the man who reaches forty is three years shorter. Has cancer done it? No; the increase in cancer is not enough to lop off much. Increase in pneumonia? No; not nearly enough to do it. In our life records why is it that the expectancy is three years less? The degenerative diseases, arteriosclerosis, kidney trouble, chronic heart trouble, the degenerative changes. What is the cause of the degenerative changes? The high pressure of American living? Nonsense; the high pressure of living usually gives us a man older than his days, but one who lives to a ripe old age as a rule. You say the tension of the twentieth century? It is not that. The tension of the twentieth century has ruined health, but bring me some figures that it has shortened life, if you can. We doctors have to treat these prematurely old neurasthenics, and we imagine some of them will be our bearers at our decease. No; it is the degenerative diseases. Arterosclerosis; what is that? Caused by overeating? No; it may be aided, but not caused by that. It is certainly caused by chronic infection of the walls of the blood vessels of the vasovasorum. Chronic heart disease, due to repeated infections. Chronic kidney trouble, not due to the disease that started twenty years ago. Chronic Bright's disease is not a disease that keeps on of its own momentum. Once started, it does not go on of its own mechanism. If Bright's disease goes on, the cause is going on too, and remember one of the causes going on is an infected nose; another cause is infected tonsils; another cause, abscesses at the roots of teeth which are devitalized. Not the only cause. No; by no means. The whole infection of the mouth, so far as we can see is one clinical picture. The pus localizing itself wherever it finds a suitable nidus, and the terminal eighth of an inch of unfilled nerve root I should think would be a beautiful nidus, and I believe it is, if we may trust our X-ray plates.

I was interested in reading not long ago a study of teeth that a dentist removed and studied with reference to their anatomy. I remember there was only a small fraction of all those teeth, especially those of more than one root, that possibly could be filled to the tip of each root; some had an angular curve, some two or three orifices to the root; in some the root was at such an angle you couldn't fill it at all. That is, that the proper filling of all the roots of a tooth for crowning was possible in a relatively small portion of the teeth that were examined.

That is an interesting discovery. Surely we have no right to seal in an unfilled root, and especially we have no right to seal in one filled with cotton. We have no right to seal in a dead nerve. Our X-ray plates show the awful results, and although the teeth may be only one element in the infection of the body, nevertheless the pus around the roots of the teeth, around the margins of the teeth, the pus in the tonsils and the pus in the nasal sinuses, all together, I believe, is one of the chief factors which have deprived the American people who reach forty years of age of about three years of possible expectancy.

I was going back not long ago with a patient who was very intelligent, and who had had unfortunate experiences with her teeth, and she made this remark: "Crowning has filled grave yards." I think that is an exaggeration. I think our crowned teeth have helped to fill grave yards. Nobody is to blame, because we lived up to the best light we had. We doctors, a few years ago, who operated on all these neurasthenic conditions, did the best we could. I think we overdid it. But we lived up to the best light we had, and you cannot ask more than that. If, later on, the advances in bacteriology and experimental work show we have overshot the mark and made mistakes, we can nicely justify ourselves by saying we did the best we could; we are sorry. Nevertheless, it does seem to me, (and does it appeal to you in the same way?) that we shall have to crown teeth in the future in a different way. First, by proper X-ray work, seeing whether or not the tooth can be filled. If not, removing the root or the portion of it that cannot be. Then filling down as far as we can fill properly, and then crowning. That would add six dollars per crown, but I believe it would save more than six dollars in doctors' bills twenty years afterwards. I cannot prove it, but I think so.

There is one other element in dentistry which has recently interested me much, and that is the question of the nervous reflexes from unerupted teeth. We have seen splendid results from the removal of unerupted teeth. We have not seen nearly as good results as we expected. We have seen troubles with mental symptoms, clear up after teeth were removed, but few clear up for very long; but there is temporary improvement. But I think it is one of the things that should be followed up by dentists as well as internists in these cases of nervous reflexes of undefinable character, always to X-ray the mouth. I was impressed with that about ten years ago. One of the bad boys in one of the schools at Philadelphia was sent to Dr. Whitmer's laboratory at the University of Pennsylvania, for psychological study. They said, "He seems bright, but he cannot sit still nor study. He pinches the other boys; is a bad boy. What is the matter?" Dr. Whitmer and his assistants studied the boy from the psychological standpoint to see what was the matter with him. They took a set of X-ray plates and found unerupted teeth, and they removed them, and the boy became well-behaved. I do not know whether he continued so.

Now the point is this: The number of persons who have these very indefinite nervous reflexes, that number of persons who have unerupted teeth and who improve after the removal of these teeth, form an interesting group. One school teacher interested me very much. She had a pain on the right side of her head; she had attacks so she couldn't hold herself; she wanted to scream, wanted to throw books; she had nervous hypertension. We were rash enough to make a guess at unerupted teeth. They were X-rayed and found and removed, and the woman improved at once. Whether she still is improved, I do not know, but I hope she is. They never do quite as well as you hope. But a woman with an unerupted tooth, who was not nervous in the first place, probably wouldn't suffer so much from the unerupted teeth. In other words, part of her suffering was from her own nervous characteristics. That was one of an interesting group without pain around the jaws. That calls attention to the marked importance of unerupted teeth as one of the causes of the nervous reflexes. I beg of you, if you are going to try to dig out an unerupted tooth which is growing horizontally, do not try a nervous woman as your first patient. Try it on the cadavers first and learn a little mouth surgery. Do not take out that tooth and take three hours for it, and have the woman a nervous wreck four years later.

To remove an unerupted tooth which is not yet through the bone, and is growing horizontally, and especially if its roots are mixed up with those of another tooth, is no joke. It is very difficult surgery. It is not within the province of every dentist to do that, unless he is specially trained for it. You may make a worse nervous wreck than you found. It is possible, especially if that person is naturally of nervous disposition, that you may do him more harm than good. That is merely another illustration of the point I made in the first place, and that is that mouth surgery is only surgery, and that the man who is able to remove a sequestrum of bone from the tibia is probably the man who could remove an unerupted tooth and do it skillfully and quickly. The man who is trained to do the big things is the man who can do the easier things, and a man does his best work when he steps down from a higher level

You are very patient with me, and I will risk another point. Do you realize that in the medical profession, among our internists, there are in the United States of America probably not twenty men whose judgment concerning autogenous vaccines is worth listening to? I doubt if there are twenty men in all America. And I am speaking of my own profession just now. And yet firms put the stock vaccines and serums on the market and went from one doctor's office to another and said, "Try it out in your practice," realizing they would get some good results and big sales. Should we doctors have used these? Has a man who is in general practice any right to try biological experiments because some very glib-talking agent from some manufacturing concern asks him to? I do not believe in America there were twenty men who could give a critical opinion concerning autogenous vaccine therapy worth listening to, and yet I believe there were probably fifty thousand men who were trying it.

If that is the experience of our profession, to a certain extent it is of yours, and in behalf of the patients who are our patients as well as yours, and whose neuroses we must treat after you are through with them, then I beg of the dentists, as well as the physicians, to not try any biological experiments merely because some smooth-talking agent asks you to, unless your laboratory training is sufficient to enable you to draw accurate conclusions, and that means a good deal.

For illustration, one of us was called to see a certain woman who had a very anomalous condition of the kidneys, and a condition that was quite critical. The history and the physical findings did not agree. After going over the case carefully with the physician in charge of the patient, this was found out: The woman, a case of sugar in the urine, was being treated with uranium nitrate, and the consultant said: "Why are you giving her that?" "Because Forshimer, in his 'Therapeutics of Internal Diseases,' makes the remark that uranium nitrate will lessen a lack of sugar." "Yes, but did he also say it was true of dogs, and it did so by causing a serious nephritis?" That man had no right to experiment with a drug, even though Forshimer had recommended it.

If that is true of the practitioner of internal medicine, in behalf of your patients, who are also our patients, we beg of you dentists to follow the advice of Prof. Frederick Miller, who said he never tried a drug until it had been in use two years and was still recommended, and he said, "I do not use any drugs in tuberculosis for that reason." In other words, let those who are well enough trained—and they are not very many—whose judgment is critical enough for that kind of work, try it out. Usually those are the men connected with your dental colleges. Follow their advice, and do not be guilty of trying the new things. Be guilty of being old fashioned, if you are in practice, and I beg that for the sake of your patients, who are also ours, and therefore for whom I have a right to make a plea, be conservative along these lines.

Scientific medicine is a very difficult problem. To check up even on one culture, one joint, took one of my friends and five assistants a whole winter, and then they admitted they came to a wrong conclusion. To prove anything accurately in dentistry must be as difficult as in internal medicine, since dentistry is only a part of internal medicine. Therefore, let those whose training gives them the right prove those things that are good, and let the practitioner not be ashamed to follow their advice.

I have spoken from the fullness of my heart. I have said some things which maybe I shall regret tomorrow that I have said, but I do beg of you, as members of the same profession to which I belong, to remember that dentistry is a part of medicine, and it is a hard subject. There are not very many of you, not very many of any of us, who are able really to say whether a certain thing should or should not be done. *Let us hold fast to those things which are good until we know that something else is better.*

DISCUSSION

Dr. A. C. Kimberlin, Indianapolis: If I had not been so absorbed and interested in what Dr. Emerson was saying to you, I would have perhaps enjoyed being here a great deal more. It is not often that I have the opportunity of seeing so many faces familiar to me as this evening, associated in the work of medicine. I am wondering how many of you have really forgotten all that you know, or at least some of the things that you know, about my early career. I hope you will be courteous enough to be quiet, because a goodly number of you know enough still that if you were to repeat it, you would put me in jail, because I was asked to discharge a duty to the dental college and dental profession at a time when things were not as Dr. Emerson has pictured them this evening. Consequently, I undertook this work with a great deal of enthusiasm that came largely from inexperience in not only a part, but all of it.

There is not very much for one to say that would be of any profit or particular benefit in discussing Dr. Emerson's subject, because he has pretty well covered the ground. However, there are a few things which, perhaps, we have different views upon, and could present in a slightly different light to some advantage.

The whole gist of what Dr. Emerson has said, when condensed in very few words, is that this is a distinctly progressive era in dentistry and medicine, that the path of righteousness is extremely narrow, and that we have been on both sides of it many times. The spirit of repentance shown by him tonight shows that he is not without fault himself, and it was more refreshing, as is Dr. Emerson's custom, to plead guilty without a case being attempted against him. The truth of the matter is that we men who call ourselves professional men do frequently, in our attempts at practical work, rather resolve ourselves into the attitude of a prosecuting attorney, get a preconceived notion, or attach ourselves to a fast-moving fad, and attempt to justify our new position, or at least prove a point, before we have sufficient evidence. We have altogether too many advocates in medicine, and when I say medicine I mean dentistry as well. We haven't enough conservatism. It is quite excusable, to be sure, because it is certainly putting it mildly to say that one is old fashioned who attempts to remain stationary in the swirl of events brought to us today, not only by scientific research workers, but by the everlasting industrious art of our commercial manufacturers. There are not many here today but who have been more or less fascinated, beguiled and misled, and who have committed a great many offenses, simply because they have taken the lure that comes from manufacturers of our various bacteriological products.

One of the saddest commentaries on medicine today is the fact that we have not had sufficient courage or backbone to stand out against what Dr. Emerson very properly calls a fad, the climax of which has brought before us in the form of so many varieties and kinds of sure cures by vaccines. Dr. Emerson rounded into the course in good style, but started wrong. He almost forgot to say that the kettle was as black as the pot. The medical profession is just as much, and a great deal more at fault than the dental profession in the matter of the use of vaccines, in the question of taking up these new methods of treatment, these so-called sure cures. They had their first impulse at the hands of the medical man himself, and not the surgeon; and if some of you dental surgeons would speak tonight what you think, I am sure you have less patience than ever with the treatment of certain infectious diseases by the use of vaccines. It will take a long time to eradicate this fad from the nooks and crannies in which it has now found a very firm footing. It is beginning to receive many blows, as Dr. Emerson tells tonight, with all the emphasis he has, against the outrageous use of vaccines.

Dr. Emerson referred to the matter of fire. I do not know of anything that taxes the skill of a dentist and which should make him feel his incompetency more than to look into the mouth of a patient suffering from a diseased condition, quite advanced, or one markedly complicated, and attempt to figure out which is fire and which is smoke. It is one of the exceedingly difficult things in medicine, I know, and I suppose it is so in dentistry.

That is still further borne out by his discussion of the tooth brush. Take a case and look into the mouth and examine it with all the care and skill and all the conservatism that you possess, and you are left considerably in doubt About all that case needs to do, unless you commit yourself pretty positively, which may be right or wrong, is to simply step across the street and see your neighbor, who gives different opinions from yours, and then the trouble is on. About the only thing left then is, of course, the scientist in medicine, or some other gentleman, who takes possession of your patient's confidence, declares you are all wrong because you are an easy victim and have disagreed among yourselves, and consequently the patient loses faith in all and becomes an educated neurasthenic, maybe one such as Dr. Emerson referred to as having been operated on eleven times. The thought that went through my mind when he made that statement was that I would a good deal rather see the surgeon who operated on her the eleventh time than to know what ailed the patient.

These are homely thoughts, to be sure, but they are too truthful to be mirthful. It is a very serious problem. I have seen them four or five times, but never eleven. I cannot conceive what the last man went after, unless it was dollars and cents. And, unfortunately, that is the muse that sings altogether too often, but we all know too well it is absolutely true. Eleven times cured by surgery temporarily was another thought I had brought out, and which should be emphasized. Almost anyone knows you can take any kind of a disease and temporarily benefit it by surgery. You can operate on an epileptic, not in every case, but in almost any kind of surgical procedure, and he will temporarily be bettered. What would you say of a neurasthenic or a psychothenic? What would you say of one educated by medical men, of one raised in an environment that had for its purpose and effect nothing whatever but to create and make a high-class neurasthenic? And, unfortunately, the worst part of it all is we find doctors galore who do not know the difference between a neurasthenia and a disease. We are at fault, medical men. The pot is just as bad as the kettle; if anything, worse, because I think until recently the medical profession, the internist, did command a certain kind of quiet respect on the part of the dentist. In the last few years, however, he has felt his oats, declared his independence, and is rather inclined to establish himself in a position more independent of the internist in medicine, the practitioner of internal medicine, a very commendable thing, to be sure; and the amazing thing about it to me has been all the time, particularly with our local situation, how the dentists have made such progress in the right direction when they are operating in a measure from an educational standpoint wholly independent.

Dr. Emerson said to you, not directly but in substance, that you must first be anatomists. Of course, we know you are, because I taught anatomy a great many years ago and I can see some of the faces here yet that were with me. We struggled along and acquired a good deal of knowledge and kept the thing going. Dr. Emerson says that you must be a bacteriologist. Surely. You must know something about pathology; quite so. You must know something about psychology. You have to—there is no other way. Consequently, if you subscribe to the standard which he has set up, all the requirements to make a successful dentist, you must be a medical man.

You know formerly we had a very different view about the medical men. In the last part of the nineteenth century the best known medical man in a community was the man who could cure disease. Old Doctor So-and-So; he could cure pneumonia, typhoid, he never lost a baby, he never lost a mother; he was a wonderful fellow, because he cured diseases. That is all changed now, and the great man today in medicine and dentistry is the man who can prevent diseases. Consequently the part played by the dental profession today, if half is true that has been pictured to you by Dr. Emerson, because he didn't get very far away from the mouth, and the extent he attempted to impress upon you the important field in which you are working in preventive medicine, you are playing a very much more important part than the medical man. And that is no exaggeration whatever, and one can never emphasize too much the importance of the work that is being done in preventive medicine today by dentists. The unfortunate and rather painful thing—and I do not mean to be personal - is that we have been careless so long as to our duty.

It has been only recently that dentists were made exclusively for the rich. We all know

American dentists are distinguished abroad, but they were distinguished because they were artists and not because they were scientists. They were distinguished because their standard of medicine did not require the same standard as in medicine. So it is just a little bit inclined to make you hidebound and tight, to take this literally, because it is not quite that way. But on the other hand we had dentists for the rich people only, because you bid for it; and the more shine and polish on the gold filling and the more crown and gold for his money, the prouder the patient was. That is done away with. But the pathetic part of it is what is happening to all these poor people. I will refer to my first experience and work at the City Hospital. It was sickening to me always to attempt to care for those poor people. Their teeth had no attention, and I always insisted that the city officials could make more money by placing a good dentist in the City Hospital who did not know anything but extraction, and let him pull everything he could get hold of—they would make money.

Nothing has been so neglected as the teeth of our poor. I am not sure now how they are being cared for. Of course, the clinic at the college used to take care of many. I suppose our social workers look after it to a certain extent, but not as it should be, largely because we have too few dentists, just as we have too few doctors. And these too few doctors are going to be felt more keenly now than ever before. It is going to be a real hardship, without anything extra going on, but it will be infinitely worse now and will remain so, because there are few of us who can realize what this advance in medical and dental education means to common people.

It is well enough in great centers, but that is not where our population lies. We have unconsciously brought about a state of affairs, the reaction of which is certain to be painful and expensive sooner or later, and this caring for our poor people's teeth is a matter of such supreme importance that it must be taken charge of by those who are authority in the matter of dental and medical education.

Dr. Emerson referred to the use of the tooth brush. I am sure he was afraid he might be misunderstood in that, because he was timid. I agree with what he said. I couldn't understand the reason for pounding your gums twice a day with the hardest brush you could find. It is the use of the tooth brush to the exclusion of everything else, the duty of that child, the history of the child, its personal health, the history of the individual himself, the parents of the child; they all have as much to do with the teeth as does the local care of the teeth, as to developing them. You see a case coming in that is distinctly tuberculous and you expect a bad set of teeth. I do not care how much work you do on them, and they will work with them in a certain way. Why? The metabolism is destroyed, and it doesn't matter what your diet is. However, the cleansing of the mouth is very important so far as caring for at least the contour and makeup of the teeth.

The doctor referred to the question of longevity. I am sure he will be patient if I do not subscribe to everything he said in the matter of degenerative diseases. As he suggested when you get your second thought going, there are some things you would probably like to do over again. The point he was making is this: He is talking to you about the controlled infectious disease, and the question of diatetics in childhood. The infant mortality rate has been lowered. The death rate increases at a tremendous percentage as the individual gets older. To be sure, this is due to degenerative diseases, but I cannot understand quite clearly the whole of it; that it is due, every one of them, to low-grade infections. To be sure the so-called sub-infections are the most potent factors in these premature degenerative changes. However, there are other factors which play a very important part, chief of which is error in duty. Another thing which contributes so much to those cases—any individual who errs in his duty, with a bad family history, whose trouble began two hundred years before he was born, is likely to find a high-blood pressure or something else, and feel it is his duty to correct, or find, at least, some point of infection, and he proceeds to devote all his energies and attention to that man's mouth, when in reality the condition found in his mouth is only smoke and not fire. There again it takes a man of fine judgment, good experience and broad education, such as makes you feel amazed almost, that medical men and dentists, too, for that matter, are able to handle it so broadly and successfully as they do. Give me a good history in tuberculosis every time; or apoplexy, renal or cardiac troubles. It plays a more important part in diabetes than in tuberculosis, if the conditions of that individual in childhood have been proper ones.

Now, we have little fear of tuberculosis when we used to feel afraid to mention the name. It is now easy to talk to a patient that has tuberculosis, because you are going to tell him how he can control that condition, if it is in a state where it is possible to be controlled. That is true about any of these degenerative diseases.

You know the old saying, "A man stands on a triad of apoplexy, renal and cardiac diseases." This afternoon I do not know when I have had my patience more greatly taxed, while trying to cross the path of two or three nose-and-throat men, who wanted to remove tonsils in a man who had a bad case of nephritis, with a pulse rate about 100. It was unpleasant, but that becomes a duty; if you think a thing and are thinking it on rational grounds, and can justify your conclusions to your conscience, stand by it. That is a part of your business, and unless you do that you are not very much of a man and a physician, and would be a poor excuse of a surgeon.

We are all caught by—what did he call it, fits or fads?—but either will do. While a fad is so truly American, we dare not deny that we are inclined to try anything that comes along; we are all faddists; sometimes they make monkeys of us; it doesn't make any difference whether we are trying to keep up with feminine styles or whether we are keeping up with the men in our laboratories, we each grab these things up, and each feels qualified to make a practical application of them just as soon as he finds a victim, because that is usually what it is—it is not a patient. This is particularly unfortunate because it is harmful; it is more than harmful, it is wrong, and to emphasize again the use of these vaccines. it is not only wrong, but it is a *downright crime*. I am one of those whom Dr. Emerson pictured this evening; I wear the same style of shoe I did twenty years ago, and I do not mean to change it. I do not mean to say I am going to stay in this shoe, medically speaking, but I have always made it a rule and have tried to follow it as nearly as I could. You will always find a faddist very far in advance of you, and he is familiar with every new drug that comes out; he is more keen than you, has a better memory, and nothing will escape him, and you will find him using all of them. A good way is to watch him and watch his results. If it is a good thing, it will stand the acid test and become an established fact. Then is the time to use it, but do not go away from a thing you are familiar with until you are assured absolutely that a new thing is established in practical medicine as a success.

We should be divided, perforce, in two great classes. We have our practical men and have our scientific or research men. These men who have facilities and special training and power of observation, who have the assistants, who have had in a measure the experience, are the right men to do our experimental and research work, especially our experimental work with new drugs and treatments. On the other hand, the man doing practical medicine is like a bull in a china closet when he attempts to take up one of these new remedies and tries to use it himself.

Take philakogen. Everybody knows it was a fortune. I came onto two patients who carried a little vial and a hypodermic, and they used it themselves. When such an outrage as that is perpetrated on the profession, there is only one place to hit it at every chance, and that is square between the eyes.

You are the guardians of public health, and when a patient comes to you, you may not fear but you are assuming very serious responsibilities. It is not a matter of life and death to him when he presents himself to you, but by your doings in connection with that man's treatment and your advice, you may allow to develop in him a condition which Dr. Emerson or no one else subsequently can control.

In degenerative diseases—we will say heart, arteries and kidneys, and certain blood states—we know to a certainty that they must either have a starting point somewhere about the mouth, whether it is in the teeth or not, as we understand now, not all but many are; so what you say to this individual may have a very important bearing. And you are in not an altogether enviable place, because you have two objects in view: First, to conserve his teeth, and if you make sacrifices that are needless you will be criticised, not only by your patient but by your fellowmen. Another thing you are charged with is the conservation of his future health, safeguarding him against the conditions for which there is no cure. You get him at a time when prevention is the thing. To play the role of a dentist—they used to be called tooth carpenters—is one of the most serious and important roles a man could take. So to be a dentist today, even though you graduated back in the nineties, do not fail to feel you are carrying a responsibility that you are not more than equal to at the best, and are in a profession that has been progressing most rapidly, and you must realize that you are side by side with every department of medicine, even though it has advanced to the highest point of efficiency at the present time. And high. sober thought, common sense, courage, the rational co-ordination of our knowledge, a little bit of conservatism, and the freer fellowship among yourselves and your alumni will make you not only more efficient, but will make you progress more rapidly and will contribute to what we are all striving for, and that is for the improvement of the human body, mind and health and happiness.

Dr. Carl Lucas, Indianapolis: It has been my pleasure in the last few years to have had under observation many cases of general infection, which have been cured by relieving the patients of mouth infection. No doubt it has been the pleasure of every dentist in this room to have seen similar results. A few years ago the members of the medical profession were pleased to observe apparent results in treatment with autogenous vaccines. We have had the warning given us tonight that possibly the apparently beneficial physical results following the treatment of mouth infection are not real results after all. The results we have observed from the removal of impacted teeth apparently establishing their intimate relation to nervous reflex conditions, after all may be but transitory, for the same psychopathic conditions occasionally recur. If we know the true status of affairs, dentally, we are very fortunate. We think we know we are arriving at some definite hypotheses, but we do not know just exactly the true status of affairs, nor what the ultimate results of our treatment of cases of mouth infection are going to be.

Dr. Emerson said that he believes infected tonsils are not so serious a menace to the health of the individual as are blind abscessed teeth. The logic for that reasoning is that an infected tonsil drains into the pharynx, while a blind abscessed tooth does not drain into the oral cavity. Infection which drains into the throat or mouth is rendered less virulent by the digestive secretions after having been swallowed. A blind abscessed tooth has but one portal of drainage—directly into the circulatory system. That is the reason the medical men are more concerned about the pathological results from blind abscessed teeth than they are the results from infected tonsils.

The first work which was done relative to psychopathic conditions and their relation to infected teeth was done by a dentist, Dr. John Stephan, of Cleveland. In Dr. Upson's book upon this subject he has given Dr. Stephan credit for the greater portion of the case records reported in that volume.

Apparently it would be advisable for an institution, such as our insane hospital, to have a dental diagnostician on its hospital staff. It seems reasonable to think that our city hospital should have a dentist on its staff. It does not seem reasonable that a past-officer of our city Board of Health should say that they do not want any more two-by-four specialists on the staff at our city hospital; however, we were so advised two years ago when we requested that the senior dental students be afforded the privileges of the city hospital, where we wished to present oral surgical clinics.

In Michigan they have a law which specifies that the state pay the transportation to and from the hospital for indigent patients, and that state pays a surgeon and an oral surgeon an annuity for all of the surgical operations necessary to be made for such people. This law has been in operation for several years and it has proven a great economic saving to the state of Michigan. In Ohio a few years ago the same law was presented in the state legislature, and is now in operation. It would be an economical proposition for the city of Indianapolis to have the daily services of dentists at the city hospital. Graduate dentists cannot donate much of their time to the city hospital; however, there should be an adequate number of dental internes admitted to practice at the hospital from each graduating class to take care of all of the cases of oral infection.

The subject of the care of children's teeth is one which has received insufficient attention. When I was the executive committeeman of this association upon two occasions, I tried to persuade dentists to write papers upon the subject of the care of children's teeth. It is a very difficult proposition to get members of our profession to write papers upon that subject and Dr. Thomson, I think, has emphasized the reason that it is difficult to secure such papers—simply because we do not know how to properly treat children's teeth. And why? Is it the fault of the dental college? No! It is the fault of the dental profession. The members of the profession at large do not care to take the time to properly treat children's teeth, thereby learning the definite technic. If someone could tell us how to properly treat and fill an abscessed deciduous second molar and preserve that tooth, without preserving focal infection, and hold the space for the eruption of the bicuspid, it would certainly be a great step forward in our scientific knowledge Not only the deciduous molars, but all of the deciduous teeth which may be pathologically involved, should be treated, filled and retained in the jaws in a healthy condition until the time for the eruption of their successors. The medical profession has had to back water, as Dr. Emerson has said, in many ways. The dental profession also has been compelled to do likewise. We have had to do so in connection with pulp canal treatment. If a pulp canal is not properly filled (and I wonder what percentage were formerly properly filled), we know the pabulum remains, furnishing nourishment for micro-organisms which are constantly circulating in the patient's blood. When non-virulent germs, relatively speaking, arrive at a focus where tissue resistance is low, such as we find at the end of an unfilled pulp canal, their virulence increases. Therefore all pulp canals of non-vital teeth must be opened and filled to their apices, and in order to do this with any degree of certainty we must check up all canal work with the X-ray.

I think it is a very desirable state of affairs that the medical and dental professions are becoming more closely allied. It is not difficult now for dental societies to procure the services of busy medical men to appear upon their programs; and occasionally the medical societies are requesting dental men to appear upon their programs. This association is to be congratulated upon having two internists of recognized authority appear upon its program tonight and give us such reasonable and logical discussions upon this very vital subject.

DR. HOWARD R. RAPER, Indianapolis: It seems we have fully concluded, first, that we do not know how to treat children's teeth; and second, that we do not know how to treat teeth of "grown-ups." In the face of such discouragement, let us have hope, for no one has said we cannot treat "chickens'" teeth.

Certainly we are not yet treating teeth as we should, and I am going to tell you again what I told you this afternoon; because it doesn't make any difference how long we talk about this subject or what is said beforehand, we always wind up facing these stolid facts: *At least ninety per cent. of toothache is preventable,* if the dentist and the patient combine their forces to prevent it. Once toothache occurs, a dental abscess may develop. But *before toothache occurs*—that is, before pulpitis—the typical *dento-alveolar abscess cannot develop.*

So why don't we start to treat teeth right, by preventing toothache? And why don't we educate the public right? So the mental attitude of the people is such that with the first stab of toothache pain the victim wails, "Oh my! There goes $50.00 if I am to have this tooth treated properly. And I must have it treated properly or it may ruin my health. Maybe I should have it extracted anyhow, for perhaps it cannot be treated successfully, for any price. Oh, dear; Oh, dear, why did I neglect it?"

Such an attitude of mind toward toothache is the one justified by its seriousness. But neither the public nor the dentists have as yet assumed this attitude. Patients develop toothache without the slightest regret, except for the pain, and with complacent confidence that their dentist can stop the pain promptly and make the tooth "as good or better than ever" for a dollar and forty-nine cents. Dentists are responsible for this attitude. We created it. We must destroy it and replace it with the right one.

The problem of giving better dental service—and actually delivering it so the people get it—is essentially a problem in economics. It isn't the truth to say we do not know how to treat teeth. Our trouble arises from our effort to administer an expensive treatment cheap.

Even Dr. Emerson, it seems, doesn't realize how costly good dental work must be. Dr. Emerson evidently goes to a dentist who is very generous with his "professional courtesy." If I understood him, Dr. Emerson said something about "amputating the end of the root and putting on a crown," and the root amputation was valued at $6.00! Scarcely anyone has any conception of what good dental treatment must cost. Of course, an imitation of good dental treatment is not so expensive. In his brilliant play, "The Doctor's Dilemma," Bernard Shaw directs attention to the obvious fact that when a certain treatment for disease is too expensive for poor people, or people of moderate means, the people nevertheless demand that they have it, or —whisper—a cheap imitation of it. Hence the stock vaccines, Dr. Emerson; hence, also, the pulp-canal work of today.

The people are not getting good pulp-canal work, and they never will get it until they pay for it. It is economically impossible to give, and continue to give, without recompense. And even if the public had the money to pay, there aren't enough dentists to do the work. It is questionable if there are enough dentists in the United States to do the pulp-canal surgery for the people of Indianapolis and do it right. *But we can eliminate ninety per cent. of what there is to be done;* so let us do that, and then we will have Dr. Emerson and Dr. Kimberlin come over and congratulate us.

THE TREATMENT AND PREVENTION OF SOME OF THE LOCAL CAUSES OF PYORRHEA*

BY P. C. KRUPP, D.D.S., HOUSTON, TEXAS

THE TERM "Pyorrhea Alveolaris," as it is now used, is a broad one. It reminds us of the student who, at the request of his father, made up an itimized list of his expenditures. He enumerated as best he could, but could not account for $200, so after much deliberation, he sat down the final item as "Charity, $200." His father's comment in replying was, "I fear charity covereth a multitude of sins."

This process causing the destruction of the tissues immediately surrounding the teeth, popularly known as pyorrhea alveolaris, has been designated by several titles: Rigg's disease, interstitial gingivitis, phagedenic-pericementitis, etc., but "pyorrhea alveolaris" is now generally accepted by the profession and public. However, the more specific appellation, "periodontoclasia," or "dental periclasia," will no doubt be the term accepted to express this condition in the near future, by the profession at least.

Much has been written regarding this very important subject, and until very recent years, each author differed so widely from any preceding that it was impossible to establish a standard or basis of operative procedure. Even today there is much argument pro and con, but I think I am correct in saying that the best results are being obtained by those who consider local conditions primary factors, and treat accordingly.

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*Read before the Texas State Dental Society, 1917.

The point I wish particularly to emphasize is the importance of the early recognition of pyorrhea; in fact, the recognition of conditions provoking it, and avoiding even the incipient stage. Have in mind the awful irreparable wastes you meet with in advanced cases. We cannot definitely determine the local destruction, much less estimate the systemic effect. Even in this day of advanced crown and bridge work and the wonderful restorations to be obtained with the inlay, a great percentage of our efforts fail to approach that degree of perfection necessary to make them of dental value; and, therefore, are the source of more serious complications than we heretofore even dreamed of. That their presence is the cause of serious destruction is readily apparent and, consequently, they must be removed. Often it is necessary to extract, although in molars it may be possible to save and use to advantage one or two roots—depending, of course, on the circumstances, which would be governed by the age, resistance, etc., of the patient. However, I must confess that, due to the serious systemic manifestations so often resulting from dental origin, unless a favorable prognosis is obtainable, after a thorough examination, I remove the suspect, preferring an artificial substitute that the patient can keep clean, and I feel sure will be of real benefit.

Naturally, these advanced cases are tedious and difficult to treat. In addition to spaces, poor contacts, ill-fitting crowns and fillings, there is traumatic occlusion to consider—a most important factor—and one requiring minute scrutiny. The necessity for its correction is so obvious that it is needless to discuss it further at present; however, its dire effects should be earnestly borne in mind and avoided by the use of anatomical restorations.

The soft tissues are most vitally affected by these symptoms, and it is the soft tissues we must maintain. Unfortunately, they have been sadly overlooked in the past but are asserting themselves so strenuously of late that they are coming into their own. They have been maltreated, misused and ignored for such ages that it is high time they receive due consideration. Prevention is the watchword of the hour. So my earnest appeal is for the soft tissues. If they are kept in a normal state, the benefit to be derived can be readily appreciated, together with the comparatively small amount of tooth repair that will be necessary. Of course, this is not a presto affair, and will require years of effort, teaching and practice before the value of these measures will be realized, but institutions like the Forsyth at Boston, the Eastman at Rochester, and others to follow, will greatly advance the day of realization.

In examining a case, I first make a thorough search for abscessed conditions, pus pockets, dead teeth; in fact, any condition that might suggest infection. If I find a doubtful symptom, the radiograph or any other means indicated for diagnosis is resorted to. The occlusion is examined to determine whether or not any trauma is being caused by under-stress. If so, it is reduced by carefully grinding the offending cusp or cusps, the points to be relieved being located by the use of articulating paper. I have already called attention to the importance of this procedure, as it is a common and persistent cause of pyorrhea. I now look for fillings having rough or overhanging margins, and in which the contact has not been restored, places where food particles might lodge, and etched or roughened enameled surfaces which allow deposits of dead epithelium, mucus and foodstuffs to become fixed and ferment, thereby causing inflammation, and be impossible for the patient to avoid. These etched surfaces invariably found at the bucco- and labio-gingivæ are too often overlooked. They are easily apparent, but if any question exists as to their presence, an application of disclosing solution will remove all doubt. Many times a patient is dismissed with a keen sense of comfort when told by the dentist, "Your teeth are all right—they don't need cleaning;" when, in fact, the teeth are crying out for protection against one of their most common enemies—these soft accumulations fermenting at their gingival borders.

Faulty mechanical conditions are corrected, and the surfaces of the teeth are very carefully and delicately planed, after which they are highly polished with a paste applied with wood points, tape and very fine strips.

Finally, the patient is instructed as to the proper daily care required, and impressed with the absolute necessity of his sincere co-operation. Of course, during the course of treatment the proper brushes, etc., are prescribed, and the necessary amount of coaching accomplished. He is now dismissed, with a time appointed at a future date, the length of the intermission being determined by the operator. I use what I term a "checking system." If a patient returning after three months shows he has managed to do exceptionally well without assistance, he is allowed four months before returning again; but if circumstances are contrary, the arrangement is reversed. Many of these precautions may seem excessive but successful dental efforts are made up of just such minute detail and care, and the successful treatment of pyorrhea is by no means an exception.

Carbolic Acid Under Pressure

It has been frequently stated that carbolic acid has anesthetic properties, but if it has, the writer has failed to discover them. The beauty about carbolic acid is that it kills whatever it touches. Using it under pressure within a tooth, it kills instantly every vestige of pulp with which it comes in contact. Immediately upon the removal of this freshly devitalized pulp, the root should be filled, as there is no anesthetic effect anywhere whatsoever, and one knows exactly "where he is at."

Gutta-percha base plate is always used for producing pressure, never soft rubber or temporary stopping.

—*C. Edmund Kells, Dental Items of Interest.*

THE USE OF DAKIN'S SOLUTION FOR ABSCESSED TEETH

BY P. L. MARSHALL, D.D.S., COLUMBUS, OHIO

HAVING noticed no mention in our dental journals of the use of the Carrel-Dakin solution for treatment of dental alveolar abscesses, I thought it might be of interest to your readers to cite a case from practice.

The patient was a young man, 22 years of age, with a chronic alveolar abscess extending from the first lower bicuspid to and including the third molar, with involvement of the alveolar process, a portion of which was necrosed, with pus burrowing down through a fistula near the angle of the jaw. It resisted all other treatment for a period of nearly two years. At the present time the abscess is closing up, discharge of pus nil, new granulations forming, and if nothing unforseen develops, I am confident the case will be completely cured in about two weeks' more time.

Method of Treatment: First, I secure a fresh solution each week from a druggist (this is absolutely necessary). The druggist makes it up for me and it is important not to get the solution too strong, as it will then produce irritation. Second, I secure a glass syringe (keep sterile) and syringe the fistula and all pus tracts out thoroughly every day (the more and oftener you syringe the solution through the fistulas the quicker the results). Third, I give the patient a bottle of said solution to carry with him at work, and he uses it as a mouth wash and forces it through the fistula himself several times daily, as the more it is used the better will be results. (Keep sterile cotton over opening on outside of jaw.)

I am writing this for the benefit of some brother dentist who has had the same worry and trouble with abscesses as I have had. Wish to say in conclusion that I tried all other germicides and antiseptics ever heard of, with no results. Of course, there could have been a radical surgical operation, but we never know results from that source; besides the patient was a poor man and could not afford operation and loss of time in employment.

638½ North High Street.

Take pain by the handle of fear, and you will always have something to suffer; take pain by the handle of courage and nothing can hurt you. Take sorrow with self-pity and you will become too lonely to live; take it by the handle of your sympathy and your sorrow shall be translated into new power to help all others who suffer.

ORAL SURGERY
CASE REPORTS

CONDUCTED BY HUGH W. MACMILLAN, D. D. S., CINCINNATI, OHIO
THIS DEPARTMENT AIMS TO REPORT INTERESTING ORAL SURGERY CASES IN BRIEF FORM, ILLUSTRATED BY RADIOGRAPHS AND PHOTOGRAPHS WHERE POSSIBLE. ARTICLES FOR THIS DEPARTMENT MUST NOT BE MORE THAN 500 WORDS IN LENGTH. SEND CONTRIBUTIONS TO DR. HUGH W. MACMILLAN, UNION CENTRAL BUILDING, CINCINNATI, OHIO.

MULTIPLE COMPOUND FRACTURES OF MAXILLA

The injury reported in this article so nearly resembles those received in the war zone that it should be of especial interest at this time. The fractures were the result of an automobile accident. As the number of these is constantly on the increase, it is quite possible that similar cases may come to our attention frequently.

Two compound comminuted fractures of the mandible occurred, one between the second and third molars on the left side and the other between the second bicuspid and first molar on the right. Above on the right side the fracture extended from between the cuspid and first bicuspid toward the median line, then posterior to the border of the hard palate. In addition to this the right condyle was forced into the auditory canal. The X-ray failed to reveal a fracture at the neck. On the left side above both anterior and posterior teeth, including the alveolar process, were much displaced, being moved easily by the fingers.

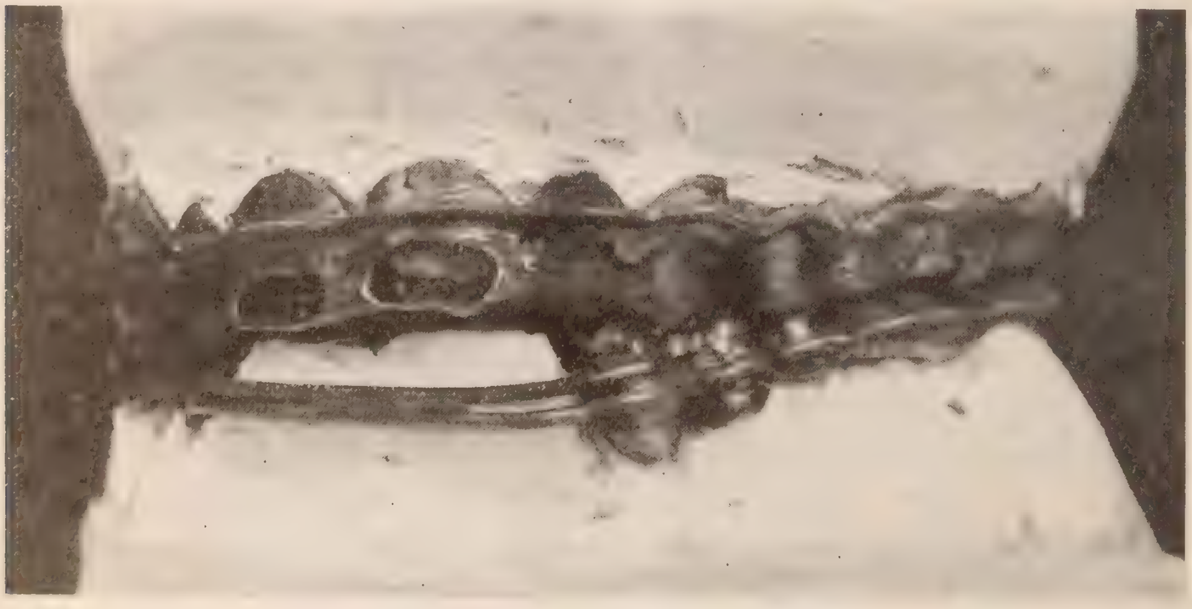

Fig. 1

The left molar bone was evidently displaced, causing a constriction of the sphenoidal fissure, which resulted in an injury to the orbital nerves and vessels, the optic nerve being perhaps permanently damaged. The nose was completely crushed in. The patient presented a distressing picture, indeed.

While she was a healthy, robust young woman, the critical condition contra-indicated an early adjustment of the parts, and no efforts were made until about one week after the accident. Impressions were taken while the patient was under opiates in soft, quick-setting plaster, the parts being disturbed as little as possible. After the various models were made they were cut and adjusted on a plain line articulator, reinforced and shaped for making the molds. The dies were made of zinc with three sets of lead counter dies, the first counter die showing the occlusal third of the teeth, the second extending to the gingival third and the third to the gum line. All undercuts were eliminated by waxing the models, of course, as the appliance must slip readily from the models, to allow of proper adjustment.

A single sheet of 26-gauge German silver was used on each splint. After careful trimming to avoid any impingement on the soft parts, the splints were placed on the models and the occlusal surfaces carefully ground to bring the teeth in the closest possible relation. In order to make the pieces as rigid as possible, a half-round 16-gauge German silver wire was soldered entirely around the buccal and lingual surfaces, being placed well toward the gingival border, an excess of German-silver solder adding to this process.

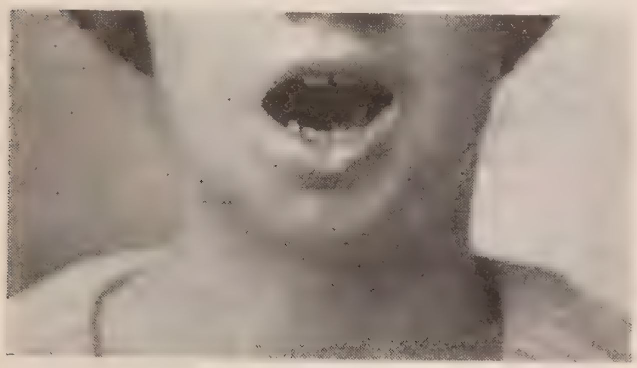
Fig. 2

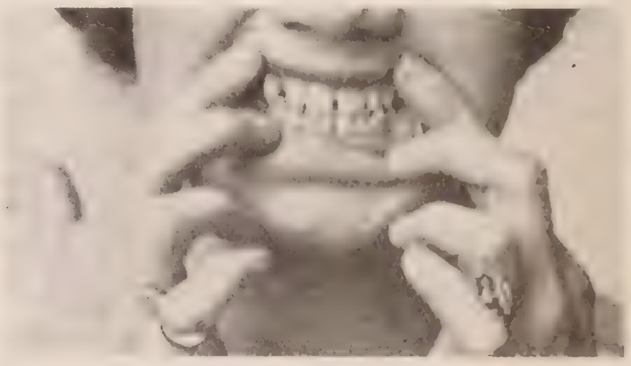
Fig. 3

The two splints were then replaced on models, and accurately adjusted to occlusion by grinding, waxed together, invested and soldered. Windows were cut in incisors and molars to aid in telling when teeth were accurately placed in position. Ten days after the accident the appliance was placed in position while the patient was under opiates.

In replacing the upper fragments the bridge of the nose was benefited by forcing the vomer and perpendicular plate into a nearly normal position. The natural inclination of these teeth made their retention in the splint an easy matter, but it was necessary to use wire ligatures on the lower incisors as the muscular tension was very great. At the beginning, bandages were secured to an occipital cap made for the purpose.

Union was secured on all fractures in five weeks, in spite of considerable suppuration. The appliance was removed a week later. Several abscesses appeared and many sequestra were removed, but good drainage and a high resistance helped to yield a very good result.

Reported by S. D. Ruggles, Portsmouth, Ohio.

EDITORIAL

THE PASSING YEAR

The year 1917 has been a memorable one. Great changes have been wrought; history has been made; the nation has been called to duty; responsibilities have increased, and there is general unrest throughout the United States. Our dentists have not been found wanting. They have not only responded to the call of duty, but have volunteered and organized independently to aid the government in the great world's war. They have enlisted in the army and navy as dental surgeons and three thousand civilian dentists have given up their practices to enter the Officers' Dental Reserve Corps. They have filled their quota in the army, and aside from this, thousands have joined the Preparedness League of American Dentists and volunteered any further service that might be necessary for the welfare of our soldiers.

As dreadful as the war is, it has had its influence in bringing dentists and physicians into closer relation and hastened that recognition from Congress that gives dentistry equal standing with medicine, and amid all this dentists have been up and doing. They have found out some of their shortcomings and mistakes and the scientific practice of dentistry presents greater proportions than ever before. But, go where you will, you'll find dentists engaged in experimenting and search work in an attempt to solve some of the great problems that confront the profession. Each day dentists are realizing more and more the responsibilities that have been thrust upon them, and the fact that every dentist has got to know more of dentistry and more of medicine to successfully meet the requirements of dentistry in the future.

So time goes on; the days are passing; the year is closing; but in spite of the unsettled conditions generally, dentists have much to be thankful for. Their offices are not being closed for want of supplies or patronage, as are many manufactories. Practice keeps up and the dentist is one of the fortunates who can declare, "business as usual." As the year closes and the new year comes, there will be additional sacrifice and the dentist should meet it with renewed courage, hope and endeavor.

We extend best wishes to you all.

XX Century Health Book—Systemic Hygiene. By H. E. Bliler, D.D.S., Chicago, Ill. Published by the author. Price, $1.00.

This book of seventy-five pages contains clinical conclusions by Dr. Bliler, endorsements, testimonials, opinions, reprints and other matter of interest, intended for public welfare.

A RARE TREAT FOR DENTAL SUMMARY READERS

In the January number of THE DENTAL SUMMARY we will begin a series of articles on "Fractures and Dislocations of the Jaws," by Chalmers J. Lyons, D.D.Sc., Professor of Dental Surgery, University of Michigan. These articles will be written from a practical standpoint and put on a working basis for the dentist. They will embrace the History of the Treatment of Fractures, the Different Classifications, Etiology, Diagnosis, the Relation of the X-ray to Fractures in Diagnostic Work, the Significance of Muscular Strain, Treatment of Fractures and Dislocations, Delayed Union, Malunion, Suppuration and Sepsis, Post-Operative Treatment, etc. The articles will be profusely illustrated and will be valuable alike to the civilian dentist and the army dental surgeon.

A series of articles on Local Anesthesia, especially Nerve-Blocking Anesthesia, will be published early in the new year. The articles are being prepared by Dr. Arthur E. Smith, Chicago, member of the faculty of Loyola University, New Orleans, and Special Instructor in Oral Surgery and Anesthesia, University of Tennessee, Memphis. Dr. Smith has probably done more research work in anesthesia, both general and local, than any other member of the dental profession in the United States, and has given post-graduate and clinical courses to nearly three thousand dentists. These lectures and clinics have been given in nearly every state in the Union in colleges and before dental societies and study clubs. The papers will be fully illustrated and of great value for study when published.

We expect to publish also during the year a series of articles on Prophylaxis and Pyorrhea, by Dr. William F. Spies, New York City. Dr. Spies has been doing some wonderfully good work along these lines and the articles will be of inestimable worth to our readers.

Among other articles that THE SUMMARY expects to publish during the early part of the coming year are the following:

"Prosthesis," by Dr. Elbert B. Owen, St. Louis. (The radical change coming over dentistry at the present time demands a higher ideal in prosthetic procedure, and Dr. Owen gives the practical phases of denture construction, pointing out the failures we commonly encounter and the methods of correcting same.)

"Indications and Technic for Root Resection," and "The Surgical Treatment of Periodontoclasia," are the subjects treated in two articles by Dr. Carl D. Lucas, Indianapolis.

"Removable Bridge Work Without Mutilation of Sound Teeth, by Dr. Norman Nesbett, Boston.

Some Special Articles on Dental Prosthesis will be contributed by Dr. Dayton D. Campbell, Kansas City.

"The Lower First Molar" will be considered by Dr. George B. Winter, St. Louis.

"Fractures of the Jaws," by Dr. Truman W. Brophy, Chicago.

"Diseases of the Mucous Membranes," by Dr. Heidingsfeld, Cincinnati, Ohio.

"Partial Dentures," Dr. W. E. Cummer, Toronto.

"Impression Taking", Dr. N. S. Hoff, Ann Arbor, Mich.

"The Treatment of Pulpless Teeth and the Technic of Cleaning and Filling Root Canals," Dr. J. P. Buckley, Chicago.

"Dental Caries," Dr. W. H. O. McGehee, Cleveland.

"The Dangers and Sequelæ of Conductive Anesthesia," R. H. Riethmueller, Montclaire, N. J.

"Systemic Derangements Related to Mouth Infections," E. C. Rosenau, M.D., Rochester, Minn.

"Some Fundamental Principles Underlying the Sterilization of Tooth and Periapical Tissues by Medication or Electrolysis," Dr. S. E. Pond, Worcester, Mass.

"The Efficiency of Medicaments for the Sterilization of Tooth Structures," Lt. Milton J. Damlos, Camp Sherman, Chillicothe, Ohio.

"Electrolytic Medication Technic; General and Special," Dr. L. E. Custer and Dr. Geo. T. Fette.

"The Silver-Ammonia-Formalin Technic for the Sterilization of Tooth Structures," Dr. H. R. C. Wilson, Cleveland.

"A Technic for Immediate Root Sterilization Without Discoloration," Dr. S. P. Cameron, Philadelphia.

"Rosin-Chloroform-Gutta-Percha Technic for the Filling of Root Canals," Dr. J. R. Callahan, Cincinnati.

"A System of Bridge and Denture Attachments which Conserve the Vitality of the Dental Pulp," Dr. F. E. Roach, Chicago.

"A System of Porcelain-Crown Construction Which Conserves the Vitality of the Dental Pulp," Dr. J. M. Thompson, Detroit.

"To What Extent May Important Blood Vessels and Nerves be Involved in Periapical Treatments and Operations?" Dr. J. R. Callahan, Cincinnati.

"To What Extent May Dentin and Cementum Be Infected in Case of Infected Pulp?" Lt. M. J. Damlos, Camp Sherman, Chillicothe, Ohio.

"To What Extent Can Infected Dentin and Cementum Be Sterilized by Medication?" Dr. M. Brooks, Boston.

"To What Extent Can Infected Periapical Tissues Be Sterilized and Regenerated by Ionic Medication?" Dr. G. T. Fette, Cincinnati.

"What Current Practices Tend to Favor the Establishment of a Condition of Infection in Tooth Structures and Periapical Tissues?" Dr. H. R. C. Wilson, Cleveland.

"To What Extent Can Tooth Structures Be Immediately Sterilized with Dilute Solutions of Formalin?" Dr. S. P. Cameron, Boston.

"What Basic Principles of Physiology Are Involved in the Destruction of Bacteria Without the Destruction of Tissue Cells, and Electrolytic or So-Called Ionic Medication?" Dr. Samuel E. Pond, Worcester, Mass.

"What Constitutional and Clinical Evidences Will Aid in Determining Whether a Suspected Tooth Shall Be Extracted, Treated or Left Undisturbed?" Dr. Weston A. Price, Cleveland.

"Hall Method of Impression Taking and Denture Construction," by Drs. I. L. Furnas and M. M. House, Indianapolis.

"Nasal Anesthesia," by Dr. M. Ecker, New York.

"Selective Anesthesia for Hazardous Risks and Difficult Oral Procedures," by Dr. Thos. G. Aller, Philadelphia.

"Vapor Anesthesia for Oral Surgery," Jos. C. Beck, M.D., Chicago.

"High-Pressure Anesthesia for Cavity Preparation," Dr. W. T. Jackman, Cleveland.

"Vapor Anesthesia with Special Reference to the Use of Ether-Oxygen in Oral Surgery," J. J. Buettner, M.D., Syracuse, N. Y.

"The Value of Warmed Gases for Extraction and Minor Operations Under Nitrous-Oxid-Oxygen," Dr. Paul Cassidy, Cincinnati.

"Further Researches in Blood Changes Under Nitrous-Oxid-Oxygen Anesthesia," Dr. T. D. Casto, Philadelphia.

"Chronic Diseases of the Mouth of Interest to Both Physician and Dentist," Dr. Kurt H. Thoma, Boston.

"Cysts of the Dental System," Dr. K. W. Dewey, Chicago.

"A Study of the Infectious Granular Tissue Found at the Apices of Pulpless Teeth Commonly Called Chronic or Blind Abscesses," Dr. Herbert A. Potts, Chicago.

"Epithelioma or Cancer of the Oral Cavity," Dr. L. D. Buckley, New York.

"Injuries of the Temporo-Mandibular Articulation; Diagnosis and Treatment," Dr. H. S. Dunning, New York.

"Tuberculosis of the Tongue," Dr. J. W. Means, Columbus, O.

"Preliminary Report of Investigations as to the Frequency of Metastatic Eye Infections from Primary Dental Foci," Dr. J. M. Levy, New York.

"Bone Surgery as Applied to the Jaws, with Special Reference to Bone Regeneration," Dr. M. I. Schamberg, New York.

"Soup-Bone Implants for the Correction of Defects of the Skull and Face," Dr. W. Wayne Babcock, Philadelphia.

"A New Operation for the Immediate Surgical Separation of the Superior Maxillary Bones to Widen the Nares, and for Improvement of Respiratory and Other Conditions," Dr. G. V. I. Brown, Milwaukee.

"The Ideal Dentist, Scientific and Cultured," Dr. I. N. Carr, Durham, North Carolina.

"The Principles of Cavity Preparation," Dr. H. B. Tileston, Louisville.

"Preparedness and Progress," Dr. W. T. Martin, Benson, N. C.

"Considerations of Problems Frequently Arising in Connection with Cases of Exodontia," Dr. J. P. Henahan, Cleveland.

"Internal Arch Correction," Dr. F. E. Williams, Los Angeles, Cal.

"Oral Focal Infection," Charles A. Peek, Salt Lake City.

"Dentistry in Relation to Pathology," Earnest Scott, M.D., Columbus, Ohio.

"Treatment and Filling of Root Canals," Dr. O. G. Wilson, Franklin, Kentucky.

"The Micro-Biological Aspect of Some Dental Inflammations," Theo. Von Beust, Herrod's Creek, Ky.

"Reinforced Silicate Cement Filling," by Dr. E. E. Haverstick, St. Louis.

"The Dental Surgeon in the Military Service," Dr. A. L. Pettee, Brattleboro, Vt.

"Focal Infection; a Personal Experience," Dr. J. P. Slater, Omaha.

"Influence of Mouth Infections on Localized Systemic Disease," Dr. A. M. Nodine, New York.

"Importance of X-ray Diagnosis in Dentistry," Dr. A. M. Nodine, New York.

"Apicoectomy," Dr. Earl Brooks, Noblesville, Ind.

"Focal Infection," Thos. H. Kelly, M.D., Chicago.

"Our Root-Canal Problems and Modern Methods of Treatment," Dr. I. Lester Furnas, Indianapolis.

"Oral Surgery Case Reports" Department will be continued by Dr. Hugh MacMillan, Cincinnati.

"Suggestions" Department will be continued by Dr. F. R. Chapman, Columbus, Ohio.

These are only a *few of the good things* that THE DENTAL SUMMARY will publish during 1918, but enough to convince any dentist why he should include THE DENTAL SUMMARY in his list of dental journals for 1918.

SOCIETY·ANNOUNCEMENTS

North Dakota State Board

The next regular meeting of the State Board of Dental Examiners will be held in Fargo, N. Dak., beginning Tuesday morning, January 8, 1918. All applications and credentials to be in the hands of the secretary ten days prior to the date of examination. For application blanks and further information, write the secretary, Dr. W. E. Hocking, Devils Lake, N. Dak.

Minnesota State

The thirty-fifth annual convention of the Minnesota State Dental Association will be held February 7, 8, 9, 1918, at the University of Minnesota, Minneapolis, Minn. All members of the National Dental Association are invited to attend this meeting. For information address

MAX E. ERNST,
1125 Lowry Bldg., St. Paul, Minn. *Secretary.*

North Carolina State

The North Carolina Dental Society meets June 19-21, 1918, at the headquarters in the Oceanic Hotel, Wilmington, N. C.

W. T. MARTIN,
Benson, N. C. *Secretary.*

Texas State Board

The Texas State Board of Dental Examiners will hold its next examination in Dallas,Texas, beginning Monday, December 17, 1917. No diplomas exchanged, no reciprocity. All applications accompanied by the fee of $25.00 should be in the hands of the secretary no later than December 12th. For further particulars and application blanks, address,

HARRISON B. CAVE,
810-14 Wilson Bldg., Dallas, Texas. *Secretary*

Rutland County Dental Society

At the annual meeting of the Rutland County Dental Society, the following officers for the ensuing year were elected: President, H. H. Yarrington; vice-president, Richard Bunker; secretary, Grace L. Bosworth; treasurer, Thomas Mound.

GRACE L. BOSWORTH, *Secy.*
Rutland, Vt.

SUGGESTIONS

Conducted by F. R. Chapman, M.S., D.D.S., Comumbus, Ohio

(To Our Readers: Give others the benefit of your practical suggestions, by sending a description of them to Dr. F. R. Chapman, Schultz Bldg., Columbus Ohio.)

Removing Broken Pin from Detached Post Crown

To remove the broken pin from a Davis or other detached-post crowns, immerse the crown in dilute sulphuric acid for a few hours, when the pin can be easily removed and the crown used again, with a pin of proper length.

—*Pacific Dental Gazette.*

To Clean the Cast Gold Inlay

The cast inlay will at times have a deposit upon its surface that cannot be removed by the use of either nitric or hydrochloric acid solutions. These deposits are usually silicates or borax and can be removed with hydrofluoric acid. A fifty-per cent. solution in water is the best to use for the purpose. It can be kept in a covered glass dish which has been coated with wax. Allow the inlay to pickle or remain in this solution for several hours, wash, and the inlay will be perfectly clean.—*F. W. Frahm, Pacific Dental Gazette.*

Sedative Paste for Temporary Stopping

On page 840 of the August *Cosmos*, Dr. Merritt describes the use of zinc oxid and oil of cloves made into the thickest possible paste as a temporary stopping with sedative qualities. This can be made even better by incorporating a quantity of cotton in the mix. It will then stand more wear. Everyone has noted the use of hair in building plaster; the cotton in the paste serves the same purpose as hair in the plaster.

I should mention that cotton incorporated in cement in this manner is claimed by some to help greatly in building out cement contour filling, using, however, only a few shreds of cotton in the cement.

—*Amos G. Stiker, Dental Cosmos.*

To Lessen Pain

After an extraction, where bone has been removed by burs or chisels, or where alveolar process is exposed, dry the surface and apply ninety-five-per cent. phenol, then neutralize with alcohol. This will lessen the post-operative pain.—*R. E. Light, Dental Review.*

Cement and Plastic Instruments

A surgical sponge dipped in melted vaseline and fastened in the tin screw-cap of a medicine bottle and secured to some handy place on the cabinet, is very useful to pass your cement and plastic instruments over when finishing off cement or gutta percha. The vaseline prevents the filling material from adhering to the instruments and also makes burnishing much easier.—*R. McClinton, Commonwealth Dental Review.*

Short Pins for Crowns

I long ago learned to greatly reduce the diameter and length of the pin in most fixed-pin crowns, which, of course, means reducing the caliber of the drilled opening. Not only are many openings for the pin too large, but they are too deep for safety. A short pin, hardly more than a quarter of an inch in length, is strong enough in most cases. With a short pin of diminished diameter one will have fewer roots splitting. The pin, however, should be squared or flattened.—*F. W. Sage, Dental Cosmos.*

By a simple expedient we can easily prevent an amalgam made from a high-grade alloy, such as Twentieth Century Perfected, from setting before we have had time to insert the filling. After triturating thoroughly with sufficient mercury to make a smooth, plastic mix, we have merely to avoid expressing the excess mercury until just before placing in the cavity. Moreover, an amalgam that has already begun to harden somewhat, may be softened again without loss of strength by adding a little more mercury and working the mass until again plastic.

Sterilizing Cotton

In going around the country and visiting the offices of different men of large reputation, I have seen them winding cotton around broaches and putting them into roots without previous sterilization. I make an attempt to sterilize cotton in using it on a broach; I do it in a way which I have never heard any one speak of. Perhaps it is hardly adequate, but I wind cotton on the broach, saturate it with alcohol and burn the alcohol, then blow out flame with chip blower as the cotton chars slightly. That is my method of sterilizing cotton.—*M. L. Hanaford, Dental Review.*

Excel in One Thing

You do some one thing better than you do any other thing. Pursue that thing, improve in it, make a hobby of it. No telling what it may mean to you. If you are known to excel in some thing, your deficiencies are minimized in the light of that fact.—*J. F. Nelson, Dental Review.*

Wax Patterns for M. O. D. Inlay

Let us take, for instance, an upper second bicuspid with an M. O. D. cavity closely situated between the molar and first bicuspid. Pack in some gutta percha on the distal side to get some separation, or if there is strong tooth structure at the gingival part of that tooth, use a mechanical separator. Prepare a disto-occlusal cavity, ignoring the mesial part altogether. Extend the occlusal part to the mesial and widen out the end past it in cone-shape form. Carve the wax to make it a disto-occlusal inlay. Into the occlusal part of the wax with a sharp lancet cut out through the entire thickness a canal or slot running from the mesial end and terminating in a cone-shape or clover-leaf shape or T-shape at the distal end, so that the wax pattern is really a disto-occlusal inlay, with the occlusal part the form of a fork, one arm of it adapted to lingual, the other to the buccal wall of the tooth. Remove this wax inlay and cast. After the inlay is fitted and finished, fill in that central slot with wax or gutta percha and cement it into place. Now proceed with the other side of the tooth. Get separation in any of the ways mentioned, remove the wax or gutta percha from the slot of the inlay in place. Carve the wax into the mesial cavity, extending it into the canal or slot of the inlay previously provisioned. Remove wax, cast and cement into place. This inlay will have its retention in that cone-shaped or T-shaped provision made in the first inlay and both will form a well-fitting, interlocked M. O. D. inlay.—*S. Siegel.*

Lower Impression

In taking lower impression, after the tray carrying the plaster has been inserted, have the patient raise the tongue as high as may be, pointing it forward; then after the tray is adjusted, drop the tongue to place. This procedure allows the thin plaster to run into every space, extending under the tongue around the edge. Do not trim this off, but preserve it sedulously, remembering that wherever the plaster runs rubber may be substituted, because it can be depended upon that plaster used as here described, very thin, will not compress or displace the tissues. The flanges so provided (by extending under the tongue) give the plate a larger bearing surface, assure the help of the tongue in holding it in place and diminish the opportunities for food to get under the denture.

—*Rupert F. Hall, Dental Items of Interest.*

Aluminum Clasps

Teeth embraced by gold clasps undoubtedly, sooner or later, show signs of decay. After many experiments we have resolved to always use aluminum clasps in future. Upon examination of teeth upon which aluminum clasps have been encircled for some considerable time, we have quite failed to find the slightest sign of decay or erosion.—*Oral Health.*

To the Officers and Enlisted Men and Women of the Army and Navy of the United States and Their Relatives:

The Secretary of the Treasury, through the Bureau of War Risk Insurance, has been charged with the administration of the War Insurance Law enacted by the Congress as a measure of justice to the men and women who have been called to give their lives, if need be, in the service of their country.

I wish to acquaint you with the benefits and privileges which your Government has placed at your disposal. It is essential that you and your families at home should know of your and their rights under this law in order that full advantage may be taken of them.

To care for the wife and children of the enlisted man during his service, the War Insurance Law compels him to contribute up to one-half of his pay for their support. The Government, on application, will generously add to this an allowance of from $5 to $50 a month, according to the size of the family. Moreover, if the enlisted man will make some further provision himself for a dependent parent, brother, sister, or grandchild, they may be included in the Government allowance.

If, as a result of injuries incurred or disease contracted in the line of duty, an officer or enlisted man or an Army or Navy nurse should be disabled, provision is made for compensation of from $30 to $100 a month to him, and, should he die, compensation of from $20 to $75 a month will be paid to his wife, his child, or his widowed mother.

In order, however, fully to protect each person and family, Congress has made it possible for every soldier, sailor and nurse to obtain life and total-disability insurance. This insurance applies to injuries received while he or she is in the service or after he or she shall have left it.

Exposure to the extra dangers of war makes the cost of life insurance in private life insurance companies prohibitive. It was, therefore, a plain duty and obligation for the Government to assume the risk of insuring hundreds of thousands of our soldiers and sailors who are making the supreme sacrifice. Under this law, every soldier and sailor and nurse, commissioned and enlisted, and of any age, has the right, between now and February 12, 1918, to take out life and total-disability insurance up to $10,000 at very low cost, with the Government, without medical examination. This right is purely optional. The soldiers and sailors are not compelled to take insurance, but if they desire to exercise the right, they must do so before the 12th of February, 1918. The cost ranges from 65 cents monthly, at the age of 21, to $1.20 monthly, at the age of 31, for each $1,000 of insurance. This is a small charge on a man's pay—small in proportion to the benefits it may bring. The premiums will be deducted from his pay, if he desires, thus eliminating trouble on his part.

To provide adequate protection until February 12, 1918, during the period when the soldiers and sailors are learning the details of this law, the Government automatically insures each man and woman, commissioned or enlisted in the military service of the United States. It pays the man $25 a month during total permanent disability; if he dies within 20 years, it pays the rest of 240 monthly installments of $25 each to his wife, child or widowed mother.

I desire to call the provisions of this just and generous law to the attention of our officers and enlisted men and women, so that they may not be deprived of their rights through lack of knowledge. Full information may be obtained from the Bureau of War Risk Insurance of the Treasury Department, Washington, D. C. I earnestly urge that the officers of the Army and Navy give to the men under their command all possible aid in helping them to understand fully the benefits that this insurance may bring to their families and the small cost at which it may be obtained.

This is the greatest measure of protection ever offered to its fighting forces by any nation in the history of the world. It is not charity; it is simply justice to the enlisted men and women and to their loved ones at home, and each and every one of them should promptly take the benefits of this great law.

W. G. McAdoo, *Secretary of the Treasury.*